INBREEDING PATTERNS IN GEOGRAPHY DEPARTMENTS AND THE REGIONALIZATION OF DOCTORAL GEOGRAPHY DEPARTMENTS: 1976-1977

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PREFACE

This study explores the inbreeding patterns and characteristics of geography departments in the United States. The objectives are to determine (1) what degree programs are most inbred, (2) what controlling agencies tend to have the highest inbred percentage, (3) what are the acceptable percentages for inbreeding in baccalaureate, master's, and doctoral bestowing colleges and universities, and (4) what are the spheres of influence for state and private doctoral geography departments. A hierarchical ranking of the doctoral departments was devised according to the level of the college or university where the graduate departments' graduates were employed during the 1976-1977 academic year. The ranking is compared with previously published rankings.

The researcher would like to take this opportunity to express his sincere appreciation to his major adviser, Dr. Keith D. Harries, for his assistance and guidance for this study. The writer is also indepted to the other members of the committee, Dr. J. Kenneth St. Clair, Dr. Stephen W. Tweedie, and Dr. James Yelvington. Their assistance and contributions toward the preparation of this study were invaluable.

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CHAPTER I

INTRODUCTION

Introduction

Whenever someone thumbs through the bulletin of an institution of higher education and skims the faculty listing which contains the location of the staff member's earned degrees, it usually becomes apparent that a number of the faculty have received one or more degrees from the same institution in which they are offering instruction. The hiring of an institution's own graduates, termed inbreeding, was much more evident in the past than it is today. The amount of inbreeding will probably vary from one type of institution of higher education to another, between similarly classified colleges within the same state or region, and between similarly classified colleges in different regions. Departments within technical colleges and universities may rely more heavily on their own graduates to offer instruction than do disciplines within the arts and sciences, due to the national dearth of technical graduates.

The researcher has observed numerous examples of inbreeding in the university in which he is employed as well as in universities he has attended. Many colleagues have commented in general discussions on the variations of inbreeding between specific departments, and preliminary study has confirmed inbreeding within several academic departments. The practice has been diluted, however, with the rapid

increase in the size of the faculty in colleges and universities during the past decade.

This geographical analysis of inbreeding evolved in order to determine whether there are areal variations of faculty and departmental inbreeding within the discipline of geography in the United States, and whether such inbreeding has any significant effects. Most publications on inbreeding have centered on the total college and university patterns and have neglected specific disciplines. This research is, therefore, unique in studying the inbreeding patterns and characteristics of a specific discipline.

The United States was divided into four sections, corresponding to the census regions, for initial comparative evaluations.[1] The geography departments were classified according to their degree program and by their controlling boards or agencies. Generalizations on inbreeding practices and characteristics could then be areally evaluated and compared in accordance with the data received from participating geography departments.

Statement of the Problem

The purpose of this dissertation is to evaluate a significant aspect of the intellectual environment in colleges and universities in the United States. One of the problems confronted is to determine the pattern of national variations of inbreeding in geography. The study will evaluate the extent of inbreeding and compare the productivity of

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[1] U. S. Bureau of the Census, Statistical Abstract of the United States: 1970, 91st ed. (Washington, 1970), p. xii.

inbred and noninbred geographers in geography departments across the country. The amount of inbreeding will vary not only in the various classifications of colleges and universities but also within the subdivisions of the institutions of higher education. Secondly, what percentage of inbreeding is considered acceptable by the geography faculty? Thirdly, is the acceptable percentage for inbreeding different between the national and regional doctoral departments? Fourth, under what conditions could the acceptable percentage be altered? A former dean at the University of Minnesota, G. S. Ford, once stated that "not more than one-third might well be maximum."[2] Is Dean Ford's maximum figure applicable to all institutions of higher education, and if not, what criteria would be acceptable for specific types of colleges and universities in the United States?

Further questions to which answers are sought are: is the practice of hiring a department's own graduates more widespread in one area of the nation than another? Is inbreeding more likely to be found in undergraduate or in graduate departments? Is inbreeding more prevalent in national or regional doctoral departments? Is inbreeding practiced more in state supported institutions of higher education or in private, church, municipal, or federal colleges and universities? Are there different kinds of inbreeding in geography departments? How does inbreeding within geography departments compare with inbreeding practices within other disciplines? Finally, does the practice of inbreeding or the number of inbred geographers have significance within geography departments across the country?

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[2]William R. Lindley, "Faculty Inbreeding," Improving College and University Teaching, XIII (Winter, 1965), p. 13.

Another problem confronted in this thesis is the regionalization of doctoral departments and their spheres of influence. Can the geography doctoral departments be classified as national or regional serving departments? If there are regional and national geography departments offering geographic instruction leading towards the doctoral degree, what departments would be classified as national? as regional? Are there any master's degree granting departments that illustrate strong regional concentrations or spheres of influence?

The above questions will be addressed in this dissertation. An attempt is made to determine whether being an inbred faculty member may have a negative connotation in geography departments or within the discipline as a whole.

The writer developed the following hypotheses after completing preliminary readings on inbreeding:

1. Geography departments bestowing only the baccalaureate degree will be least inbred.
2. The master's degree bestowing institutions will be more inbred than the baccalaureate schools, but less inbred than the doctoral granting universities.
3. Private, church, municipal, and federal controlled colleges and universities with undergraduate geography programs will be more inbred than the public institutions within the same categories.
4. Geographers employed in doctoral departments will have more publications than geographers within the master's and bachelor's degree programs.

5. Noninbred geographers will have more publications than inbred geographers.
6. Inbred geographers will have a higher acceptable percentage for inbred faculty than noninbred geographers.
7. Geography departments granting the higher degrees will have a higher acceptable percentage for inbreeding than the baccalaureate departments.

Review of the Literature

Historically, inbreeding of the faculty at institutions of higher education has been a common practice in colleges and universities in the United States. Charles W. Eliot, a long time president of Harvard University, wrote

> It is natural, but not wise, for a college or university to recruit its faculties chiefly from its own graduates ---- natural, because these graduates are well known to the selecting authorities, since they have been under observation for years; unwise because breeding in and in has grave dangers for a university, as also for technical schools and military academies.[3]

Caplow and McGee wrote inbreeding is "commonly disapproved but widely practiced."[4] Veysey states that "inbreeding of faculties was considered a virtue, inasmuch as it assured that new appointees had come to maturity in a proper atmosphere."[5] The rationale for inbreeding,

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Charles W. Eliot, University Administration (Boston, 1908), p. 90.

Theodore Caplow and Reese J. McGee, The Academic Marketplace (New York, 1958), p. 41.

Lawrence R. Veysey, The Emergence of the American University (Chicago, 1965), p. 47.

therefore, has been that an academic department knows the capabilities of its own graduates in contrast to graduates of other schools. Inbred personnel also led to the continuity of values and preservation of academic traditions, standards, and schools of thought. Sociologist Shichor suggests inbreeding is most frequent within the more prestigious sociology departments and further writes that departments cannot risk their high standards by hiring a large number of doctorates from lower ranked departments.[6] Using data for new doctorates in 1959, Hargens found that the physical and biological sciences had a lower percentage of inbreeding within their respective teaching staffs (13 percent) than the faculties of the humanities and the social sciences (18 percent).[7]

Graduate faculties tend to have the greatest range of inbreeding. The prestigious universities are most inbred, according to Berelson. He further writes inbred faculty members are found in approximately 60 percent of the graduate faculties at the top universities, and the percentage decreases to approximately 15 percent in other colleges and universities.[8] Berelson also writes there is a cycle that exists with reference to where one goes to graduate school:

> When people go to graduate school, then, they go out and up: out to institutions of rank similar to their own

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[6]David H. Shichor, "Prestige and the Sociology Establishment," The American Sociologist, V (1970), p. 157.

[7]Lowell L. Hargens, "Patterns of Mobility of New Ph.D.'s Among American Academic Institutions," Sociology of Education, XLII (1969), p. 31.

[8]Bernard Berelson, Graduate Education in the United States (New York, 1960), pp. 112-113.

> undergraduate institution, up to institutions generally considered better. When they leave graduate school, they go out and down.[9]

Berelson further writes that where one is employed depends, generally, on where the doctorate was granted. There is much more movement downward from the doctorate institutions to less prestigious colleges and universities than movement upwards to a more prestigious school. If the new doctoral graduate is from a prestigious university he has a one in three chance to find employment in a similarly classified institution, whereas, should the new doctorate be from a lower ranked graduate program, his chances of being employed by a top university are between one and five and one in ten.[10] It should be noted Berelson's data are for 1959 doctoral graduates and the current employment situation would probably dictate a much lower probability of being employed by a prestigious university than in either case stated above.

The migration of doctorates from place to place has been studied by many scholars. Hargens writes that approximately 16 percent of the doctorates in 1959 were hired by the institutions that granted the doctoral degree. Further, 19 percent remained within the same region but obtained positions in less prestigious colleges and universities. However, 29 percent accepted positions at institutions rated similarly to the granting university, but in other regions of the country.[11] In a similar study on the mobility of doctorates, Marshall wrote

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[9] Ibid., p. 114.

[10] Ibid.

[11] Hargens, p. 23.

> Although shifting between various regions of the country was widespread, there was one significant exception. Those economists who were trained in southern graduate schools tended to remain in the south even while shifting from one state to another.[12]

Berelson also noted that students tend to remain within the region in which the doctorate was bestowed. He noted that those who earned their doctoral degree in a public university also obtained a position within the public sector. If the scholar's educational background was from private institutions, then employment would be sought within the private sector. Sixty percent of the scholars with a public university background were employed in a public institution of higher education, and 50 percent of those scholars with a private university background were offering instruction in a private college or university.[13]

Eells and Cleveland published a landmark survey on faculty inbreeding in 1935.[14] The article was based on a survey of 219 institutional catalogs, and was probably a follow-up of Cleveland's doctoral dissertation.[15] The two authors also published a manuscript several months earlier on faculty inbreeding, generally comparing types of institutions across the country.[16] The Eells and Cleveland studies

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[12]Howard D. Marshall, The Mobility of College Faculties (New York, 1964), p. 54.

[13]Berelson, p. 114.

[14]Walter C. Eells and Austin C. Cleveland, "The Effects of Inbreeding," Journal of Higher Education, VI (1935), pp. 323-328.

[15]Austin C. Cleveland, "Faculty Inbreeding in Institutions of Higher Learning in the United States" (unpub. Ed.D. dissertation, Stanford University, 1933).

[16]Walter C. Eells and Austin C. Cleveland, "Faculty Inbreeding," Journal of Higher Education, VI (1935), pp. 261-269.

compared 5,707 inbred faculty members with a similar number of noninbred faculty. The researchers compared the two groups on the basis of length of service, institutional membership, subject matter taught, sex, and academic rank. Data were from catalogues, but secondary sources were also used. Eells and Cleveland concluded that

> From every standpoint from which objective evidence has been collected, it appears that the probabilities of academic advancement, scholarly productivity, and outside professional recognition are distinctly greater for men who have had their academic preparation in institutions other than those in which they are teaching.[17]

In 1943, James B. Roberts completed his doctoral dissertation on faculty inbreeding, using Cleveland's study for comparative data. Roberts concluded almost one-third of the faculty across the country were inbred, with doctoral institutions having the highest percentage, and the baccalaureate schools the lowest inbred rate.[18] Lafferty published an article on the inbreeding patterns and characteristics in Texas Teachers Colleges, comparing his findings with the inbreeding percentages of 1937 at the same institutions.[19]

The above sources give an historical perspective on faculty inbreeding. All the studies focused on institutional inbreeding patterns, except the recent articles by Shichor, which centered on

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[17]Eells and Cleveland, "The Effects of Inbreeding," p. 324.

[18]James B. Roberts, "Inbreeding Practiced in Appointing College and University Teachers and Administrators" (unpub. Ph.D. dissertation, George Peabody College for Teachers, 1943), p. 195.

[19]H. M. Lafferty, "Of Time and the Teachers Colleges----in Texas," Peabody Journal of Education, XLII (1964), pp. 14-22.

the mobility of sociologists and the hiring practices of prestigious sociology departments.[20]

Several dissertations have been completed by geographers on the migration of doctorates, whether earned doctorates in all fields of study over a period of time, such as Dakan's,[21] or the concentration on geographer Ph.D. migration over 30 years by Spata.[22]

The present research concentrates on geography departments within the United States. An initial review of The Professional Geographer listings of dissertations and theses for the past 10 years revealed that no studies on inbreeding in higher education faculties had been completed by geographers. The 16th volume of The Comprehensive Dissertation Index, 1861-1973, Geography and Geology, did not reveal a title suggesting a comparable dissertation topic had been completed in geography.

Definition of Terms

The following definitions will be used throughout this dissertation.

Inbred Faculty: Any member of the geography teaching faculty will be considered inbred if he or she has received one or more degrees from the institution of higher education in which he or she is employed.

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[20]Shichor, "Prestige and the Sociology Establishment," and "Prestige and Regional Mobility of New Ph.D.'s in Sociology," The American Sociologist, VIII (1973), pp. 180-186.

[21]Arthur W. Dakan, "Migration of Earned Doctorates, 1960-1970" (unpub. Ph.D. dissertation, Univ. of California at Los Angeles, 1974).

[22]Carolyn Lee D. Spata, "Mobility of Ph.D. Geographers: 1942-1971" (unpub. Ph.D. dissertation, Univ. of Michigan, 1974).

Departmentally Inbred Department: A geography department will be considered inbred if the department has three or more members on the full time teaching staff and 50 percent or more of the teaching staff have obtained their highest degree from the same graduate school.

Geography Department: A geography department will include any department that is offering geography courses and was listed in either Schwendeman's Directory of College Geography in the United States[23] or the Guide to Graduate Departments of Geography in the United States and Canada.[24] Thus, this study is not restricted to those institutions of higher education where the departmental title was restricted to geography.

Method and Procedure

Introduction

All geography departments that participated in this study were classified according to degree granting status and control of the college or university. The period studied for this dissertation was the 1976-1977 academic year. A list of the geography departments was compiled from two sources: Schwendeman's Directory of College Geography

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[23]J. R. Schwendeman, Sr., and J. R. Schwendeman, Jr., eds., Directory of College Geography in the United States (Eastern Kentucky Univ. Geographical Studies and Research Center, Vol. XXVII [Richmond, 1976]).

[24]Association of American Geographers, Guide to Graduate Departments of Geography in the United States and Canada: 1975-1976 (Washington, 1975).

in the United States[25] and the Guide to Graduate Departments of Geography in the United States and Canada.[26] The geography departments were then classified into the following three categories: (1) four-year institutions offering only an undergraduate geography program, (2) those institutions offering baccalaureate and master's degrees, and (3) those institutions offering baccalaureate, master's and doctor's degrees in geography. All three divisions were further subdivided according to the control of the institution, whether it was state, church, private, municipal, or federal.

Instrumentation and Data Collection

Questionnaires (see Appendix A), with a letter of introduction (see Appendix B) on the reverse side of each questionnaire, were sent to all department chairpersons in a package for delivery to the geography faculty in departments compiled from the above sources. A cover letter was addressed to the department chairperson (see Appendix C) explaining the research goals. Data that were available from the Association of American Geographers Directory, 1974[27] were typed on the geographer's respective questionnaires, if the geographers were members of the Association in 1974. The respondents were requested to check the accuracy of the typed data and to fill in those blanks for which

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[25]Schwendeman and Schwendeman, Directory of College Geography in the United States.

[26]Association of American Geographers, Guide to Graduate Departments of Geography in the United States and Canada: 1975-1976.

[27]Association of American Geographers, Association of American Geographers Directory: 1974 (Washington, 1974).

information was not available from the AAG Directory. The questionnaire method was preferable to the most recent college or university catalogs because (1) catalogs are usually one or more years behind the current faculty roster, (2) some catalogs list only the highest degree earned and the bestowing institution, and (3) it is difficult to separate the geography staff from the total listing of an institution's faculty since most catalogs list the faculty alphabetically. The questionnaire also served as an avenue to explore the respondent's opinions on faculty inbreeding and as a source for other data not otherwise available.

The questionnaires were mailed to the department chairperson with a cover letter asking assistance in distributing the questionnaires to his or her staff. There were 2,967 questionnaires mailed in November, 1976, and 2,037 were returned, or 68.65 percent (see Table 1 and Appendix D). The last returns were received in June, 1977. Two states with few geographers, Alaska and South Dakota, had 100 percent completion. Hawaii had the lowest return, 8.7 percent. Thus, the range was 91.3 percent with the median 73.1 percent, represented by South Carolina. Table I shows the national returns, by sections. The North Central Section led the nation with a 73 percent return rate; the West was lowest with 61 percent.

The data on the returned questionnaires were coded and punched on computer cards to be sorted and analyzed later by computer, using the Statistical Analysis System (SAS).[28] The data were used to calculate

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[28]Jolayne Service, A User's Guide to the Statistical Analysis System (Raleigh, North Carolina State Univ., [Department of Statistics] 1972).

TABLE I

RETURNED QUESTIONNAIRES, BY SECTION

Section	Number		Percent
	Sent	Returned	
Northeast	632	430	68.04
South	791	551	69.66
North Central	960	701	73.02
West	584	355	60.79
Totals:	2,967	2,037	68.65

national norms of faculty and departmental inbreeding in geography departments for the three categories listed above, for comparative purposes. Data for all maps and tables used in this study were obtained from the information received on respondents' returned questionnaires or calculated from data included on the returned forms.

The questionnaires also provided space for respondents to check what they considered to be the maximum permissible percentage for faculty inbreeding. A space was also available for the participants to check the number of publications they had authored or co-authored. Comparisons will be made between the current research and the previous studies, even though the latter were of the total institution and not centered on a specific college or department of a university, nor on the national pattern of a specific discipline.

Analysis of Data

Differences from Place to Place. Variations from place to place of faculty and departmentally inbred departments was studied according

to the three categories previously mentioned: the bachelor's degree, the master's degree, and the doctor's degree. Some regions were more inbred, by faculty inbreeding and by departmentally inbred departments, than other areas of the United States. Data are presented in tables and maps, using absolute and relative information. The chi-square statistical techniques were applied to test the findings of this research to determine whether inbreeding is more frequent in some regions and less frequent in others.

Diffusion. The diffusion of faculty members from specific geography graduate programs to colleges and universities within one or more of the four sections used in this study will illustrate patterns of concentration for departmentally inbred departments. Some regional patterns were discernible, and the spheres of influence of doctoral institutions were mapped. Gould's Spatial Diffusion was consulted,[29] as well as other sources on diffusion.[30]

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[29]Peter Gould, Spatial Diffusion (Association of American Geographers Commission of College Geography Res. Paper No. 4, [Washington, 1969]).

[30]Brian J. L. Berry, "Hierarchical Diffusion: The Basis of Developmental Filtering and Spread in a System of Growth Centers," Growth Centers and Regional Economic Development, ed., Niles M. Hansen (New York, 1971); also printed in Man, Space, and Environment, ed., Paul English and Robert C. Mayfield (New York, 1972). Lawrence A. Brown and Kevin R. Cox, "Empirical Regularities in the Diffusion of Innovation," Annals of the Association of American Geographers, LXI (1971), pp. 551-559. R. D. Garst, "Spatial Diffusion and Information Diffusion," Proceedings of the Association of American Geographers, V (1973), pp. 75-80. Egon G. Guba, "Diffusion of Innovations," Educational Leadership, XXV (1968), pp. 292-295. Judith W. Meyer, "A Typology of Diffusion and Adoption Process," Proceedings of the Association of American Geographers, VII (1975), pp. 145-150. Judith W. Meyer, Diffusion of an American Montessor Education (Univ. of Chicago, Department of Geography Research Paper No. 160 [Chicago, 1975]). Everett M. Rogers, Diffusion of Innovation (New York, 1962).

Spatial Organization. The tests discussed above should substantiate diffusion generalizations and illustrate spatial organization between specific graduate schools and other colleges and universities. Thus, regional maps will illustrate departmentally inbred department patterns within regions. Other maps will illustrate the transcending characteristics of some graduate programs within the United States. The domination of some graduate schools in sections of the country are discernible. This will also illustrate the spatial interaction between graduate schools and specific areas of the nation.

Spatial Interaction. Spatial interaction between specific graduate schools and colleges and universities within regions and transcending regional boundaries has been suspected in the past. This research will illustrate some of these interactions by studying the departmentally inbred department patterns. Are graduates from the prestigious institutions hired by other prestigious schools within the same geographic region or in other sections of the country? Evidence suggests prestigious departments tend to hire products from other prestigious departments. Haggett's[31] and Abler, Adams, and Gould's[32] works offer guidelines for the study of spatial interaction between geography doctoral programs and colleges and universities.

Regionalization. Regionalization is one of the major topics for this dissertation. A region, by definition, is an area with

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[31]Peter Haggett, Geography: A Modern Synthesis (New York, 1972).

[32]Ronald Abler, John Adams, and Peter Gould, Spatial Organization: A Geographer's View of the World (Englewood Cliffs, N. J., 1972).

homogeneity according to the criteria developed by the researcher. Regions in this study were based on what graduate school dominated other colleges and universities within a given area. Many books and articles have been written on the regionalization concept in geography. In 1959, Hartshorne published a sequel to his earlier scholarly and philosophical book on geography; both publications dealt with the regional concept.[33] Others who have published works on developing the regional concept include James and Jones,[34] Kostbade,[35] English and Mayfield,[36] and Monmonier.[37] All of the above were consulted in connection with the following work.

Comparisons. A ranking system for geography doctoral departments devised in this dissertation will be compared with previously published rankings of doctoral geography departments. Such a ranking by Sopher and Duncan[38] will form a basis for the comparisons to determine if a hierarchy of departments exists and if inbreeding is most common in the

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[33]Richard Hartshorne, Perspective on the Nature of Geography (Chicago, 1959). Richard Hartshorne, The Nature of Geography: A Survey of Current Thought in the Light of the Past (Lancaster, Pa., 1946).

[34]Preston E. James and Clarence F. Jones, eds., American Geography: Inventory and Prospect (Syracuse, 1954).

[35]Trenton Kostbade, "A Brief for Regional Geography," Journal of Geography, LXIV (1965), pp. 362-366.

[36]Paul English and Robert C. Mayfield, ed., Man, Space, and Environment: Concepts in Contemporary Human Geography (New York, 1972).

[37]M. S. Monmonier, "Comparisons of Quantitative Regionalization Methods," Geographical Review, LXII (1972), pp. 426-428.

[38]David E. Sopher and James S. Duncan, Brahman and Untouchable: The Transactional Ranking of American Geography Departments (Syracuse Univ. Geography Department Discussion Paper Series, No. 10 [Syracuse, 1975]).

higher ranked, more prestigious departments, as was found in sociology by Shichor.[39] The research findings will also be compared with the Roose and Andersen study, which ranks the doctoral geography departments as well as graduate departments within other disciplines.[40]

Cartographic Techniques. Maps and tables are constructed from the data obtained from returned questionnaires to determine whether a national hierarchy and regional patterns exist. Maps are presented to illustrate the dispersal of graduates and ABD students from selected doctoral bestowing geography departments.

Chapter Divisions

This study is divided into five chapters. Chapter Two analyzes published doctoral rankings for doctoral degree bestowing geography departments. A rank-order system developed in this thesis is compared to those previously published. The spheres of influence of public and private doctoral bestowing departments are analyzed and regions for the departments are delineated in Chapter Three. Chapter Four evaluates the faculty and departmentally inbred department patterns of the baccalaureate, master's and doctoral institutions of the United States. The chapter evaluates (1) inbreeding patterns and characteristics of colleges and universities by their respective controlling agencies, (2) comparisons between institutions of higher education under the

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[39]Shichor, "Prestige and the Sociology Establishment," V, 157 ff.

[40]Kenneth D. Roose and Charles J. Andersen, A Rating of Graduate Programs, American Council on Education (Washington, 1970), pp. 60-61.

same control within the same section as well as with similarly controlled institutions in other areas of the country, (3) sectional findings of faculty and departmentally inbred department inbreeding in the three levels of degree granting institutions, and (4) the percentage of acceptable inbreeding by inbred and noninbred geographers. Chapter Five presents conclusions of this study and recommendations for further research.

CHAPTER II

HIERARCHICAL RANKINGS OF DOCTORAL GEOGRAPHY DEPARTMENTS

Introduction

Most geographers have developed a mental hierarchy for doctoral bestowing departments. There are several published rankings of the doctoral programs, some by geographers, and others that were generated from data collected from geographers and administrators.[1] A numerical rank-order system was attempted here to add weight according to the type of degree offered by the department where graduates and ABD students of doctoral departments offer instruction. As an example, a graduate teaching geography in another doctoral program should have more influence on the position of his former graduate department than a graduate from the same doctoral program teaching in a baccalaureate or master's degree granting college or university.

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[1]Peter Beaumont, "On the Origin and Dispersal of Professional Geographers," Professional Geographer, XXIII (1971), pp. 154-157; Allan M. Cartter, An Assessment of Quality in Graduate Education, American Council on Education (Washington, 1966), pp. 36-37; Jack Gourman, The Gourman Report: A Rating of American and International Universities, National Education Standards Inc. (Los Angeles, 1977), p. 68; Kenneth D. Roose and Charles J. Andersen, A Rating of Graduate Programs, American Council on Education (Washington, 1970), pp. 60-61; David E. Sopher and James S. Duncan, Brahman and Untouchable: The Transactional Ranking of American Geography Departments (Syracuse Univ. Geography Department Discussion Paper Series, No. 10 Syracuse, 1975).

Rank-Ordering of Doctoral Geography Departments

There are five rankings of doctoral programs for geography that have been published in the past 12 years. Four of the five will be briefly summarized, followed by the development of a new weighted ranking system.

The most widely known hierarchical ranking of doctoral graduate departments is that published by Roose and Andersen (see Table II).[2] This study superseded that of Cartter,[3] which was published four years earlier. Roose and Andersen ranked the geography departments on information obtained from questionnaires "sent to 144 scholars in geography departments throughout the country."[4] The top 15 positions were ranked in order, and each department received a 3.0 or higher rating out of a 5.0 maximum. Geography departments listed below the initial 15 departments were listed in two groups, each alphabetical. Those ranked 16 had a rating from 2.5 to 2.9, and those departments ranked 22 had a rating from 2.0 to 2.4.

Beaumont's study was similar to that of Roose and Andersen (see Table III).[5] Beaumont's information was from two sources: (1) Guide to Graduate Departments of Geography in the United States and Canada: 1970-1971[6] and (2) Directory of the Association of American

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[2]Roose and Andersen, pp. 60-61.

[3]Cartter, pp. 36-37.

[4]Beaumont, p. 154.

[5]Ibid., p. 156.

[6]Association of American Geographers, Guide to Graduate Departments of Geography in the United States and Canada: 1970-1971 (Washington, 1970).

TABLE II

ROOSE AND ANDERSEN'S 1969 RANK-ORDER OF GEOGRAPHY DEPARTMENTS

Rank	Institution	Rank	Institution
1	University of Chicago	13	University of Iowa
2	University of Michigan	15	Johns Hopkins University
3	University of Minnesota	16	University of Georgia
3	University Wisconsin-Madison	16	University of Illinois
5	Univ. California-Berkeley	16	Louisiana State University
6	University of Washington	16	Michigan State University
7	Ohio State University	16	University of Oregon
8	Penn State University	16	University of Texas
8	Syracuse University	22	University of Cincinnati
10	U.C.L.A.	22	Columbia University
10	University of Kansas	22	University of Florida
10	Northwestern University	22	Indiana University
13	Clark University	22	University of Maryland

Source: Roose and Andersen, p. 60.

TABLE III

BEAUMONT'S RANKING OF DOCTORAL DEPARTMENTS

University		Number of Professorial Faculty	University		Number of Professorial Faculty
Wisconsin		46	Columbia		13
Berkeley		42	Iowa		13
Chicago	I	40	U.C.L.A.		13
Washington		39	Illinois		12
Michigan		37	Johns Hopkins		11
			Louisiana State	IV	11
Northwestern	II	30	Harvard		10
Clark		25	Kansas		10
			Ohio State		10
Syracuse	III	19	Penn State		10
Minnesota		18	Michigan State		9
			Indiana		8

Source: Beaumont, p. 156.

Geographers: 1970.[7] Beaumont calculated a ratio for the professorial faculty, comparing the assistant, associate, and full professors to the full professors. He used the faculty of doctoral bestowing departments only. The ranking was listed according to the number of professorial faculty, and not by the ratio. The latter was used as a descriptive guide. There seemed to be little difference between the ratio for a department and its position with respect to the number of professorial faculty. Beaumont concluded there was great similarity between his study and that of Roose and Andersen.[8] Twelve of the top 15 graduate departments in the Roose and Andersen study were in the top 15 positions of Beaumont's study. Beaumont had a much broader data base than the study published by the American Council on Education. Beaumont's concluding statement was

> It is interesting to note that if, in a survey, each faculty member of a Ph.D. granting department were to vote that the department from which he himself obtained his graduate education was amongst the best in the nation, then the results would be remarkably similar to the ranking published by the American Council on Education.[9]

This would probably be due to the number of graduates from each department.

Sopher and Duncan wrote, however, the "correlation between Beaumont's and Roose and Andersen's ratings is not particularly strong, especially when only the fourteen top departments are considered."[10]

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[7]Association of American Geographers, Directory of the Association of American Geographers: 1970 (Washington, 1970).

[8]Beaumont, p. 156.

[9]Ibid., p. 157.

[10]Sopher and Duncan, p. 10.

The correlation coefficient was .478.[11] Sopher and Duncan ranked the doctoral geography departments "on the principle that placing Ph.D.'s gives prestige according to the rank of the taker."[12] The criteria used by Sopher and Duncan were as follows: (1) include only those geographers with the rank of assistant professor and above, (2) exclude inbred faculty, and (3) exclude "multiple donations of Ph.D.'s from one department to another."[13] The rankings of Sopher and Duncan are presented in Table IV.

The fourth published ranking was the Gourman Report.[14] Each institution of higher education was evaluated from data obtained from two sources: (1) questionnaires, and (2) supplemental information obtained by a selected team representing Gourman. The data were quantified and each graduate department was scored, with 5.0 the maximum. Table V represents the Gourman ranking. The first 15 geography departments were ranked in order. Two other listings were printed in alphabetical order (3.5 to 3.9 and 3.0 to 3.4). The Gourman method was similar to that by Roose and Andersen except the former used secondary data in addition to information on returned questionnaires.

A comparison of Sopher and Duncan's ranking with the previous rankings discloses several differences. The Sopher and Duncan study was similar to the Gourman Report except for two differences: Clark and

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[11]Ibid., p. 11.

[12]Ibid., p. 17.

[13]Ibid., p. 19.

[14]Jack Gourman, The Gourman Report: A Rating of American and International Universities, National Education Standards Inc. (Los Angeles, 1977), p. 68.

TABLE IV

SOPHER AND DUNCAN'S TRANSACTION RANK OF DOCTORAL DEPARTMENTS OF GEOGRAPHY

Rank	Institution	Rank	Institution
1	University of Michigan	19	University of Georgia
2	University of Washington	20	Clark University
2	Univ. Wisconsin-Madison	21	University of Colorado
4	University of Chicago	22	University of Pittsburgh
5	University of Minnesota	23	St. Univ. New York-Buffalo
6	Northwestern University	24	S. Ill. Univ.-Carbondale
7	University of Kansas	25	University of Texas
8	University of Iowa	26	University of Florida
9	Univ. California-Berkeley	27	Columbia University
9	Penn State University	27	University of Oklahoma
9	Syracuse University	29	University of Maryland
12	University of Illinois	30	Louisiana State University
13	Michigan State University	30	Texas A. & M. University
14	Ohio State University	32	Univ. Nebraska-Lincoln
15	Indiana University	32	Univ. North Carolina
16	University of Hawaii	32	Oregon State University
17	Johns Hopkins University	32	University of Tennessee
18	U.C.L.A.		

Source: Sopher and Duncan, p. 21.

U.C.L.A. were ranked in the top 15 of the Gourman Report whereas Indiana and Michigan State were in the top 15 of the Sopher and Duncan study. The similarity between the Gourman Report and the Sopher and Duncan study could be due to both being relatively recent studies in contrast to those published by Roose and Andersen and Beaumont. The Sopher and Duncan study was also quite similar to the Roose and Andersen rankings, with three differences. The latter had Clark, Johns Hopkins, and U.C.L.A. within the top 15 geography programs, Sopher and Duncan had Illinois, Michigan State, and Indiana in the elite group. The largest disparity was between the Sopher and Duncan study and that

TABLE V

THE GOURMAN RANKING OF DOCTORAL DEPARTMENTS OF GEOGRAPHY

Rank	Institution	Rank	Institution
1	University of Chicago	13	Clark University
2	University of Michigan	14	University of Iowa
3	University of Minnesota	15	University of Illinois
4	Univ. Wisconsin-Madison	16	Columbia University
5	Univ. California-Berkeley	16	Johns Hopkins University
6	University of Washington	16	Louisiana State University
7	Ohio State University	16	Michigan State University
8	U.C.L.A.	16	University of Oregon
9	Northwestern University	16	University of Texas
10	University of Kansas	22	University of Florida
11	Penn State University	22	Indiana University
11	Syracuse University	22	University of Maryland

Source: Gourman, p. 68.

by Beaumont. The former had Indiana, Michigan State, Kansas, Ohio State, and Penn State in the top 15 universities for geographic study, while Beaumont had Clark, Columbia, Johns Hopkins, Louisiana State, and U.C.L.A. Thus, there was agreement on only 10 of the leading 15 universities. Time could have been a factor between the two studies: 1975 and 1970, respectively.

Data obtained from questionnaires returned to the writer were used to calculate a ranking of the doctoral bestowing geography departments. The method used to achieve rankings differed from the previous studies in the following respects: (1) No limitations were placed on the number of geographers from a specific doctoral program nor were inbred faculty excluded, as in the Sopher and Duncan study. (2) In contrast to the methods used by Beaumont and Sopher and Duncan, instructors were

included. (3) The colleges and universities where graduates and ABD students were teaching were used. Finally, there was a broad data base due to the large number of replies from the questionnaires instead of a small, possibly biased sample obtained from scholars within geography departments that were to be ranked, as was the case with the Roose and Andersen study and possibly the Gourman Report.

All geographers with the doctoral degree or ABD status were tabulated with their respective doctoral program. They were also classified according to the degree program offered in geography by the employing institution of higher education. Doctoral Program Degree Points (DPDP) were then calculated, using the following formula:

$$\text{Doctoral Program Degree Points} = \frac{1(N_b) + 3(N_m) + 5(N_d)}{N} \qquad (2.1)$$

where N_b equals the number of graduates and ABD students teaching in baccalaureate colleges or universities, N_m equals the number of geographers teaching in master's degree programs, and N_d equals the number of Ph.D.'s and ABD students employed full time in doctoral programs in the United States.

To determine the hierarchical structure, arbitrary weights were assigned to the type of degree program offered by the employing institution. Only doctoral geography programs having 15 or more graduates and ABD students that responded to the questionnaires mailed for this study were included. Table VI presents the ranking of the doctoral geography departments by the Doctoral Program Degree Points (DPDP) system. The third column presents the degree points, and column four lists the total number of doctoral degrees and ABD students used in

TABLE VI

RANK-ORDER OF GEOGRAPHY PROGRAMS BY DOCTORAL PROGRAM DEGREE POINTS

Rank	Institution	Degree Points	Number of Ph.D.'s and ABD Students	Number of Graduates in Doctoral Programs	Noninbred Graduates in Doctoral Programs	Degree Points Without Inbred Staff	Rank
1	California-Berkeley	3.98	47	30	28	3.93	1
2	Washington	3.72	64	33	25	3.54	3
3	Northwestern	3.65	55	28	28	3.65	2
4	Wisconsin-Madison	3.38	63	31	31	3.38	4
5	Chicago	3.35	69	31	27	3.25	5
6	Syracuse	3.23	53	23	23	3.23	6
7	Iowa	3.21	47	21	20	3.17	7
8	Illinois	3.12	65	18	16	3.07	8
9	Ohio State	3.09	47	15	13	3.00	9
10	U.C.L.A.	2.89	55	16	13	2.77	13
11	Michigan	2.88	82	25	23	2.83	12
11	Kansas	2.88	50	12	11	2.84	10
13	Indiana	2.84	38	11	11	2.84	10
14	Minnesota	2.79	47	15	12	2.64	14
15	Michigan State	2.58	62	12	11	2.54	17
15	Colorado	2.58	19	4	4	2.58	15
17	Florida	2.57	23	6	4	2.33	19
18	Penn State	2.55	49	11	11	2.55	16
19	Clark	2.50	76	14	13	2.47	18
19	Georgia	2.50	28	5	3	2.31	20
21	Louisiana	2.46	48	10	7	2.29	21
22	Columbia	2.38	42	13	11	2.25	23
23	North Carolina	2.26	27	3	3	2.26	22
24	Maryland	2.25	16	3	3	2.25	23
25	Pittsburgh	2.10	29	2	2	2.10	25
26	Nebraska-Lincoln	1.92	52	2	2	1.92	26
27	Tennessee	1.88	34	0	0	1.88	27
28	Oregon	1.74	19	1	0	1.56	28
29	Oklahoma	1.31	39	1	1	1.31	29
Totals		$\bar{X}$ = 2.78[a]	1,345	396	356		

a = mean of all doctoral departments participating in this research

this study. The fifth column lists only those graduates for the listed university teaching in doctoral programs. Column six is similar

to column five except the number of inbred geographers were removed from the data in column five. The seventh column is the recalculated DPDP after the removal of the inbred geographers. The eighth column ranks the adjusted DPDP.

The DPDP generally identified the top ranking geography departments that were listed in the four published rank-order listings. Agreement was closest, according to the Spearman Rank Correlation Coefficient technique, between the DPDP system and the Beaumont study (.773). There was agreement with only 11 of the top 15 universities, but not in order. The 11 were relatively close in their respective positions in the two methods. Beaumont's study used the professorial ranks only, and his data were from the Directory of the Association of American Geographers: 1970.[15] Some geographers teaching in graduate and undergraduate programs were not members of the Association of American Geographers and were not included in the Directory. Beaumont's second source was the Guide to Graduate Departments of Geography in the United States and Canada: 1970-1971, and not all Ph.D.'s or the highest earned degrees were designated by every graduate department.[16] There probably have been additions and deleations in faculty within many geography departments between 1971 and 1976. The relatively close correlation between the Beaumont study and the DPDP could be attributed to both samples using only geographers employed in colleges and universities, whereas the other studies generally evaluated the total program of each

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[15]Association of American Geographers, Directory of the Association of American Geographers: 1970.

[16]Association of American Geographers, Guide to Graduate Departments of Geography in the United States and Canada: 1970-1971.

doctoral department. Thus, the large population represented by the DPDP ranking and a more recent data base should illustrate a more meaningful and current rank-order.

Three positions in the top 15 of the Roose and Andersen rankings differed from that of the DPDP hierarchy. The order was not the same, as illustrated by a .361 result from the Spearman Rank Correlation Coefficient test. Penn State, Johns Hopkins, and Clark were in the top 15 of the Roose and Andersen study, whereas the universities of Illinois, Indiana, and Michigan State were in the top 15 of the DPDP study.

Only two differences were noted between the DPDP listing and the Gourman Report. Penn State and Clark were in the top 15 positions in the latter, whereas Indiana and Michigan were in the top 15 in the DPDP rankings. The Spearman test illustrated the comparisons were weak between the two studies (.245).

Comparison between the Sopher and Duncan study and the DPDP illustrated but a single difference in the top 15 listings, although the order did not correspond. Penn State was tied for ninth in Sopher and Duncan's study and was 18th in the DPDP. U.C.L.A. was 10th in the DPDP list and 18th in the transactional listings. The Spearman test suggested the relationship between the two studies was weak (.384). There was little difference within the top 15 departments between the DPDP and the Sopher and Duncan rankings, but the orders were varied.

It is believed the Doctoral Program Degree Point method of ranking doctoral bestowing geography departments warrants consideration. A broad base was used to calculate the weights for each doctoral department. The weights were arbitrarily set because the purpose of the

DPDP was to give more prestige to those graduates and ABD students from doctoral programs that were employed in other graduate departments. There was little variation in the DPDP rankings when inbred geographers were removed. A major liability of the DPDP method would be that a department with few graduates could obtain a high DPDP if a significant number of its graduates were employed primarily by graduate departments. A case in point was Johns Hopkins University with 13 geographers participating in this research having a 3.46 DPDP rate. The above mentioned university was listed from 11th to 18th in the four published studies. Thus, the DPDP method is another means to rank doctoral programs, with an advantage that it is quantitatively simple.

Summary

There are five recognized hierarchical rankings of doctoral departments, each having its own method for evaluating the geography departments. Variations between the rank-orders were due, in part, to the criteria established by the researchers ranking the graduate programs. Another method for ranking the geography departments, on the basis of Doctoral Program Degree Points, was presented. Arbitrary weights were given to each graduate according to the degree program of the employing department. The rank-order was similar to most published listings, although not in the same order.

CHAPTER III

THE REGIONALIZATION OF THE SPHERE OF INFLUENCE FOR DOCTORAL GEOGRAPHY DEPARTMENTS

Introduction

Many geographers have preconceived ideas and mental maps of areal spheres of influence for major geography doctoral departments in the United States. Using information obtained from returned questionnaires, maps were constructed to illustrate the spheres of influence for most doctoral geography departments.

Table VII presents a regional summary for the dispersion of doctoral degree holders and the ABD students from private and public doctoral geography programs for the 1976-1977 academic year. There was very little regional variation for geographers teaching in the same state as the bestowing institution. The national average was 19 percent, or one in five, with the percentage slightly higher for the private universities.

The comparison of percentages between the public and private department geographers remaining in the same census sub-region as the bestowing doctoral department also illustrated little variation. The national average was 36 percent. State supported universities in the South Atlantic Census Sub-Region had a 51 percent retention rate. Generally, the further west, the lower the regional retention value.

TABLE VII

DISPERSION OF DOCTORAL GRADUATES AND ABD STUDENTS FROM PUBLIC AND PRIVATE DOCTORAL GEOGRAPHY PROGRAMS

Census Sub-Region	Total Number Geographers	Percent Public Graduates and ABDs Remained in Same		
		State	Sub-Region	Census Region[j]
Middle Atlantic[b]	62	31	48	57
South Atlantic[c]	100	25	51	60
East-South Central[d]	44	23	34	64
West-South Central[e]	108	10	34	49
East-North Central[f]	393	18	38	47
West-North Central[g]	196	10	26	54
Mountain[h]	31	13	19	26
Pacific[i]	209	22	37	49
Public Totals:	1,143	19	37	51

Census Sub-Region	Total Number Geographers	Percent Private Graduates and ABDs Remained in Same		
		State	Sub-Region	Census Region[j]
New England[a]	100	20	31	41
Middle Atlantic[b]	130	24	38	47
South Atlantic[c]	13	0	8	15
East-North Central[f]	124	22	41	49
Mountain[h]	7	14	14	14
Private Totals:	374	21	36	49
NATIONAL TOTALS:	1,517	19	36	50

a = CT, MA, ME, NH, RI, VT

b = NJ, NY, PA

c = DC, DE, FL, GA, MD, NC, SC, VA, WV

d = AL, KY, MS, TN

e = AR, LA, OK, TX

f = IL, IN, MI, OH, WI

g = IA, KS, MN, MO, NB, ND, SD

h = AZ, CO, ID, MT, NM, NV, UT, WY

i = AK, CA, HI, OR, WA

j = Northeast (a and b above)
South (c, d, and e above)
North Central (f and g above)
West (h and i above)

The exception was the Pacific Census Sub-Region. The pattern reflects the teaching opportunities in four year colleges and universities, since most are located east of the Rocky Mountains, except for the concentration along the Pacific coastal states.

The regional retention rate was almost 50 percent for the nation: 49 percent for private universities and 50 percent for state supported departments. The South (South Atlantic, East-South Central, and West-South Central) had a retention rate of 54 percent, which was similar to the findings by Marshall.[1] The North Central Census Region (East-North Central and West-North Central) was second with a 49 percent retention rate, followed by the Northeast with 47 percent and the West with 45 percent. This, too, generally illustrated fewer four year institutions of higher education west of the Mississippi River, especially in the Mountain Census Sub-Region. The latter had the lowest retention rate of the eight sub-regions having state supported doctoral geography departments that participated in this study.

Regionalization

A method for identifying nodal regions, developed by Nystuen and Dacey,[2] was used to determine the spheres of influence for the major doctoral programs in geography. All programs that had 15 or more graduates or ABD students that responded to the questionnaires were included. The columns of the matrix contained the number of graduates

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[1] Marshall, p. 54.

[2] John D. Nystuen and Michael F. Dacey, "A Graph Theory Interpretation of Nodal Regions," Papers and Proceedings of the Regional Science Association, VI (1961), pp. 29-42.

and ABD students from each doctoral program, and the rows represented the number of geographers from each doctoral department employed in each state. It became apparent there were two types of geography doctoral programs: (1) regional departments and (2) national departments.

A national doctoral bestowing geography department had more than 50 percent of its graduates and ABD students that responded to the questionnaire employed outside the census region in which the department was located. The regional geography department had more than 50 percent of its graduates and ABD students employed within the same census region as the doctoral department.

There were 29 departments that had 15 or more respondents to the questionnaire, and 13 were classified as national departments (see Table VIII). The table presents percentage data for the number of graduates and ABD students from doctoral departments employed in the state, census sub-region, and region of the doctoral bestowing geography department. Three of the 13 national departments were private, and 54 percent of the 13 national departments were located in the North Central Region. There were three national departments in the West, two in the Northeast, and one in the South. Three of the national geography departments, Colorado, Kansas, and Oklahoma, were located in census sub-regions that have few employment opportunities for geographers in colleges and universities. Only the state of Michigan had two doctoral geography departments that were classified as national.

The following are summaries of spheres of influence for public and private doctoral geography departments, by census regions.

TABLE VIII

NATIONAL AND REGIONAL DOCTORAL GEOGRAPHY
DEPARTMENTS: 1976-1977

Department	Number of Ph.D.'s and ABD's	Percent Employed in		
		State	Sub-Region	Region
Colorado	19	15.7	21.0	31.5
Clark	76	14.4	23.6	32.8
Syracuse	53	9.4	16.9	33.9
Ohio State	47	19.1	36.1	36.1
Michigan	82	13.4	32.9	41.4
Kansas	50	6.0	20.0	42.0
California-Berkeley	47	19.1	29.7	42.5
Washington	64	17.1	37.5	43.7
Chicago	69	27.5	40.5	44.9
Michigan State	62	17.7	35.4	45.1
Oklahoma	39	15.3	35.8	46.1
Indiana	38	21.0	36.8	47.3
Iowa	47	4.2	17.0	48.9
Wisconsin-Madison	63	17.4	38.0	50.7
North Carolina	27	40.7	48.1	51.8
Penn State	49	30.6	46.9	53.0
Georgia	28	17.8	42.8	53.5
Northwestern	55	14.5	41.8	54.5
Columbia	42	28.5	52.3	57.1
Minnesota	47	19.1	31.9	57.4
Louisiana State	48	25.0	35.4	58.3
Illinois	65	16.9	49.2	58.4
U.C.L.A.	55	36.3	40.0	60.0
Pittsburgh	29	48.2	58.6	62.0
Maryland	16	31.2	56.2	62.5
Tennessee	34	14.7	29.4	64.7
Florida	23	13.0	52.1	65.2
Nebraska-Lincoln	52	11.5	32.6	67.3
Oregon	19	21.0	68.4	73.6

Clark University was the leading producer of geography doctorate and ABD students in New England. The dispersion of students from Clark was widespread, but most were employed east of the Mississippi River (see Figure 1a). Clark was classified as a national university. Other

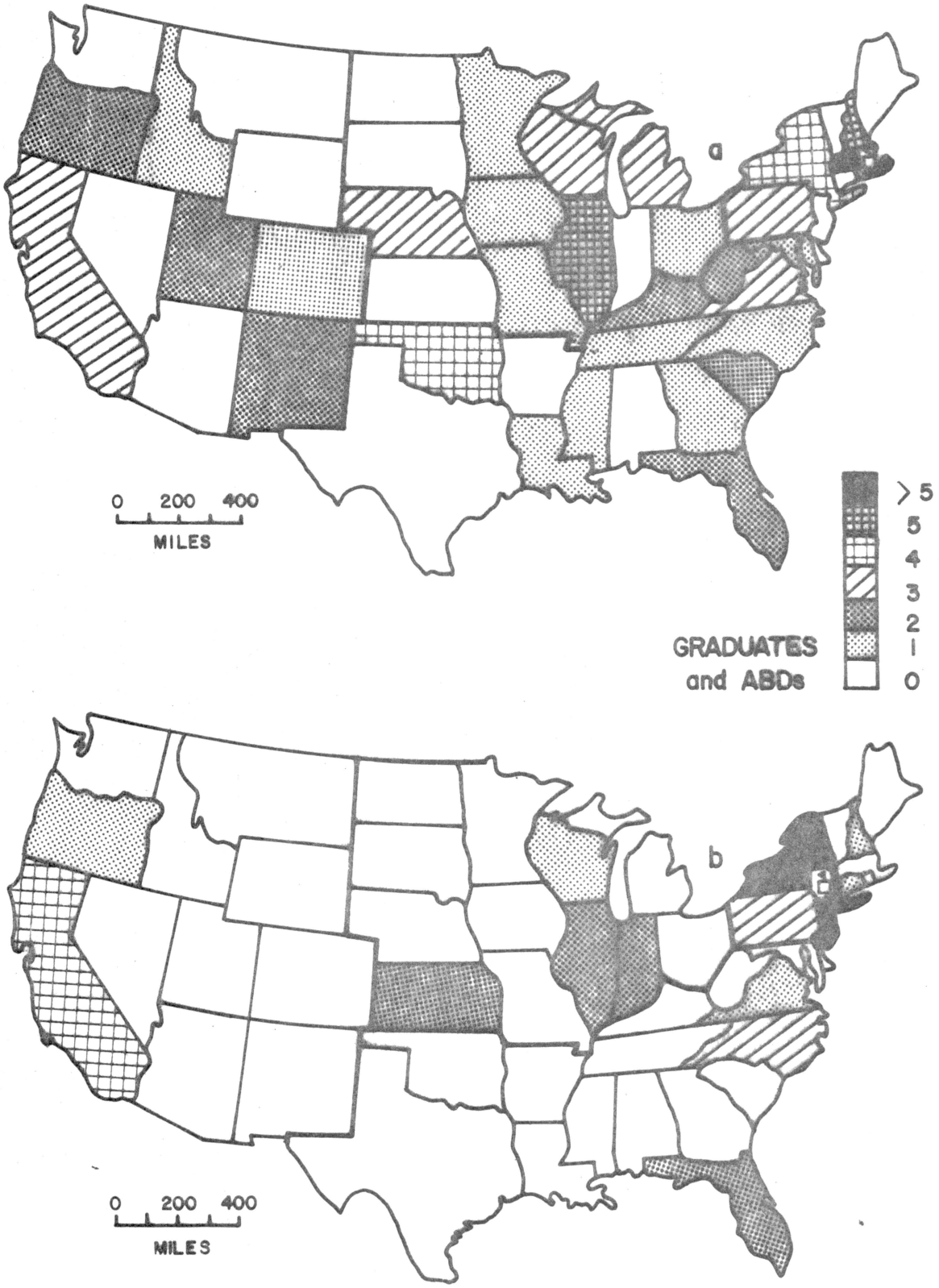

Figure 1. The Dispersal of Doctoral Geography Graduates and ABD Students from (a) Clark University and (b) Columbia University

doctoral departments in New England were located at Harvard University and Boston University.

Columbia University led in New York and New Jersey, and more than half of Columbia's geography graduates were employed in the Northeast (see Figure 1b). Columbia University was classified as a regional institution. Syracuse University was classified as a national school for geographic education. Syracuse did not lead in any state, but more than 50 percent of Syracuse's graduates were employed outside the Northeast (see Figure 2a).

Penn State University and the University of Pittsburgh were classified as regional universities. Penn State had 15 graduates and ABD students employed in Pennsylvania, compared to 14 from the University of Pittsburgh. The major concentration of graduates from both universities was east of the Mississippi River (see Figure 2b and Figure 3a). Rutgers University would also be considered a regional university because more than half of Rutgers' graduates and ABD students were employed in the Northeast.

Fifteen of 23 graduates and ABD students from the University of Florida were employed in the South; thus, the university was classified as a regional school. The University of Georgia was also a regional university. Most of Georgia's graduates and ABD students were employed east of the Mississippi River (see Figure 3b). More were employed in North Carolina (six) than in Georgia (five).

The University of North Carolina was classified as a regional school for geographic study (see Figure 4a). Only two other southern states had graduates from North Carolina. The other graduates migrated north of the Ohio River and east of the Mississippi River.

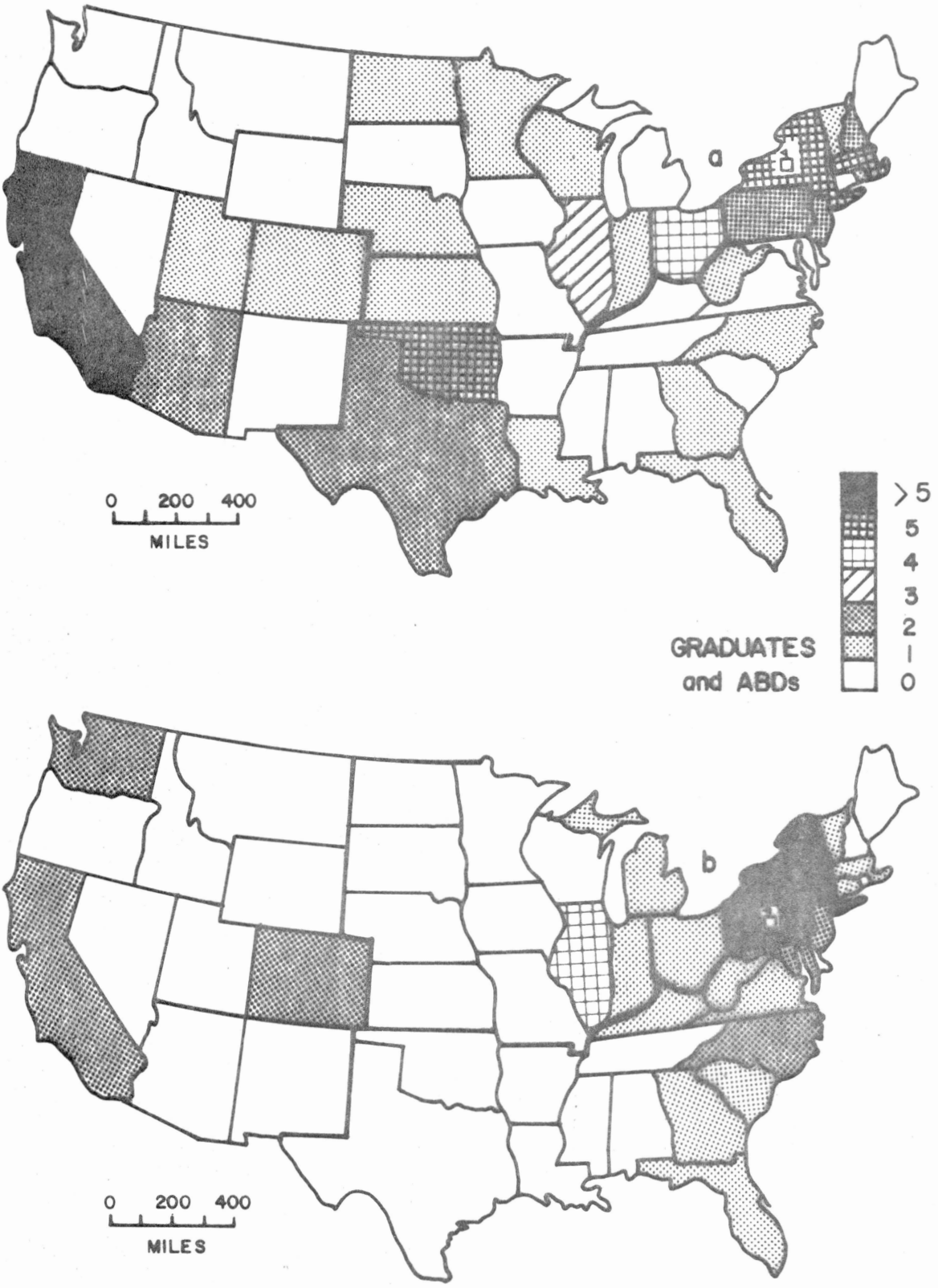

Figure 2. The Dispersal of Doctoral Geography Graduates and ABD Students from (a) Syracuse University and (b) Penn State University

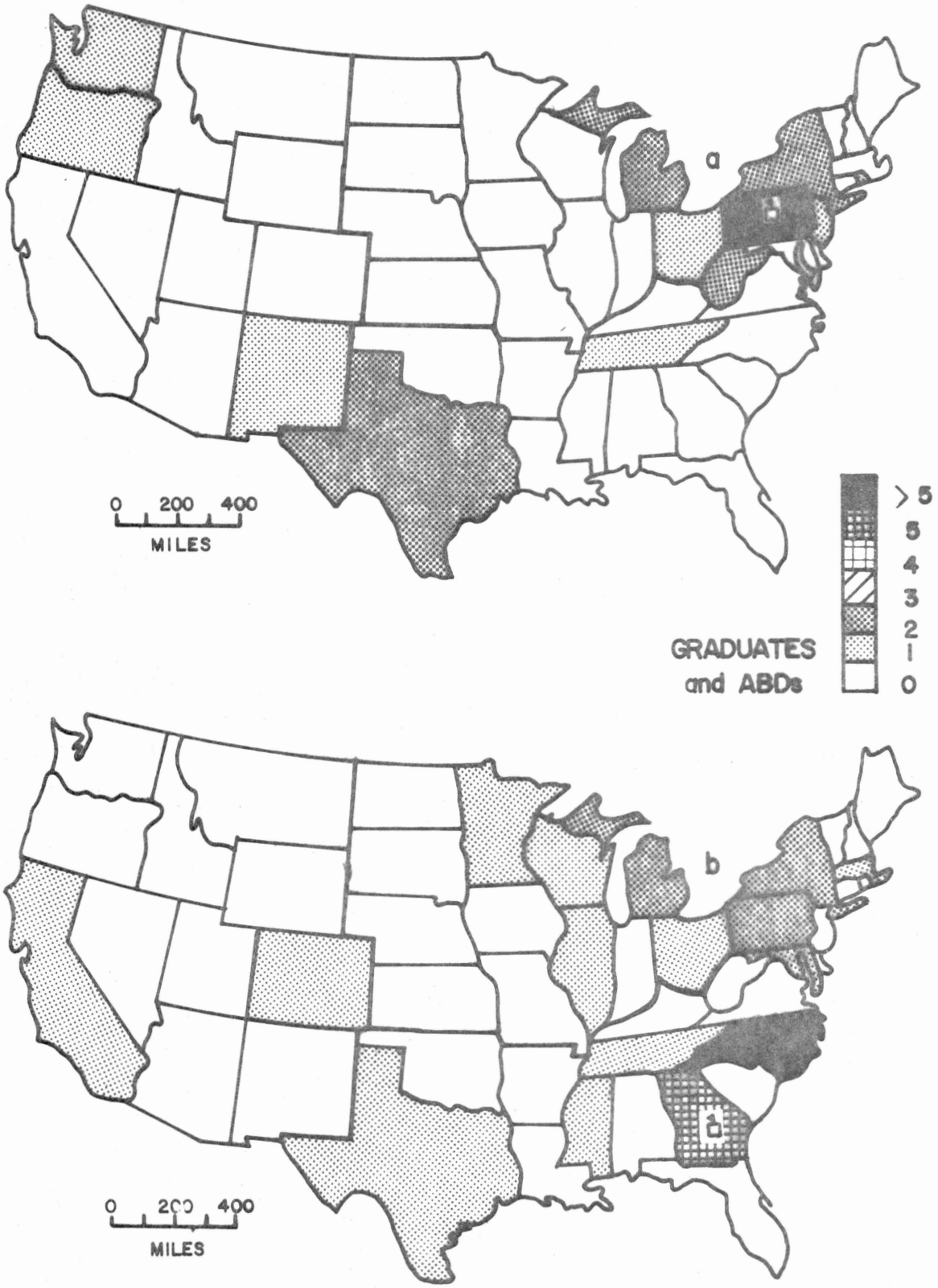

Figure 3. The Dispersal of Doctoral Geography Graduates and ABD Students from (a) the University of Pittsburgh and (b) the University of Georgia

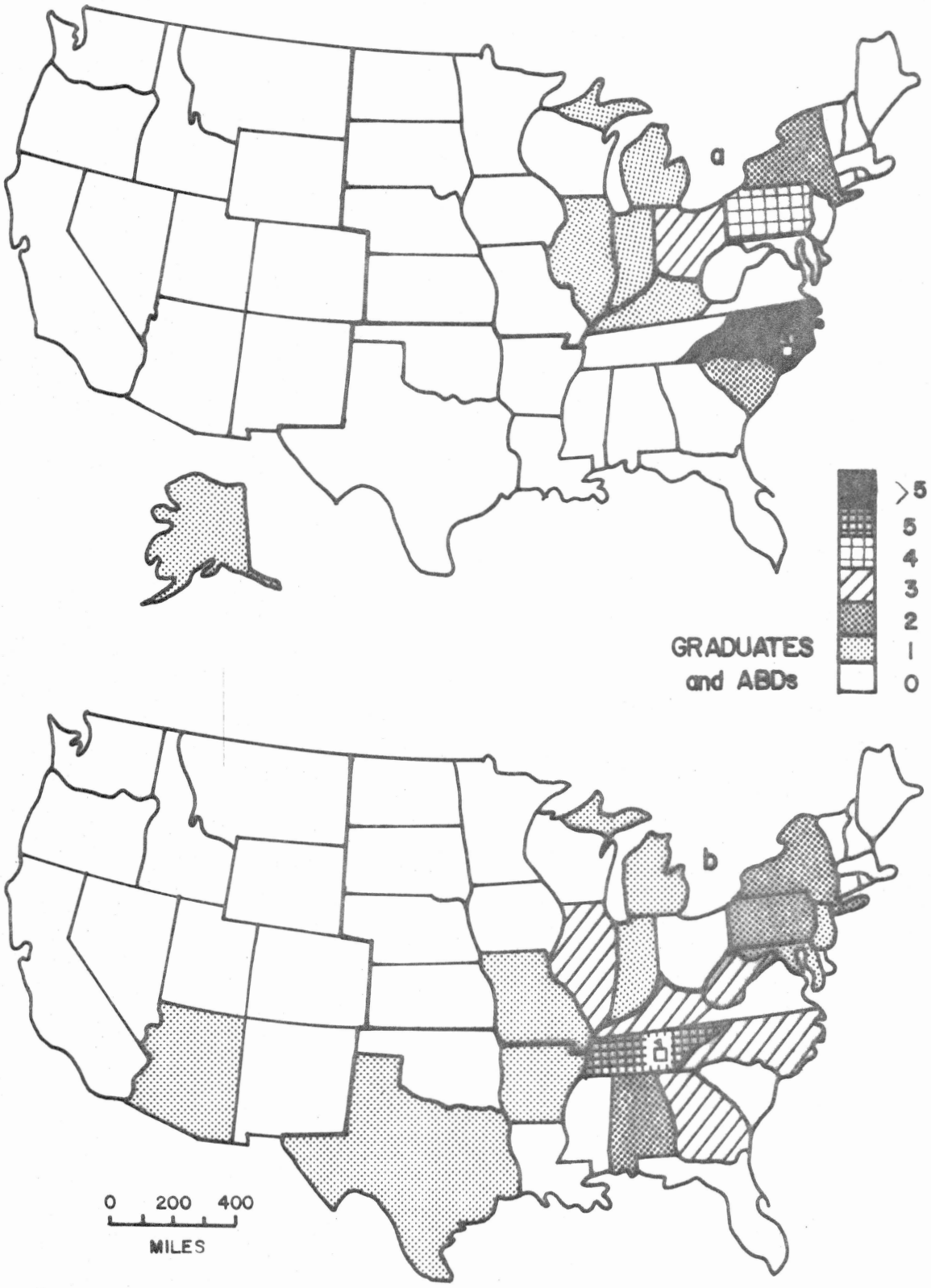

Figure 4. The Dispersal of Doctoral Geography Graduates and ABD Students from (a) the University of North Carolina and (b) the University of Tennessee

The University of Kentucky led in Kentucky and was classified as a regional school. Kentucky also illustrated a transitional pattern between the South and North Central regions. Besides the geographers employed in Kentucky, only one other geographer was in the South. The remainder of Kentucky's graduates were north of the Ohio River.

The University of Tennessee also was a regional university for geographic study. Only four graduates and ABD students were located west of the Mississippi River (see Figure 4b). The university led in the number of geographers employed in Tennessee and West Virginia.

Another regional geography department was located at Louisiana State University. LSU had a wide dispersion of its graduates, but more than 50 percent were employed in the South (see Figure 5a). The University of Oklahoma was classified as a national school. Almost 78 percent of the graduates and ABD students from Oklahoma employed in the South were located in the West-South Central Sub-Region. Most of the Oklahoma trained geographers were employed outside the South.

Other universities that did not have enough graduates to be classified included Florida Atlantic University, Florida State University, Oklahoma State University, Texas A. & M. University, and the University of Texas.

The University of Chicago led in the number of geographers employed in Illinois and Virginia, and had a large representation in other states (see Figure 6a). The university was classified as a national university for geographic study. Northwestern University was classified as a regional school. The University led in the number of geographers in Iowa, but most of Northwestern's graduates and ABD students were in the East-North Central Sub-Region (see Figure 6b).

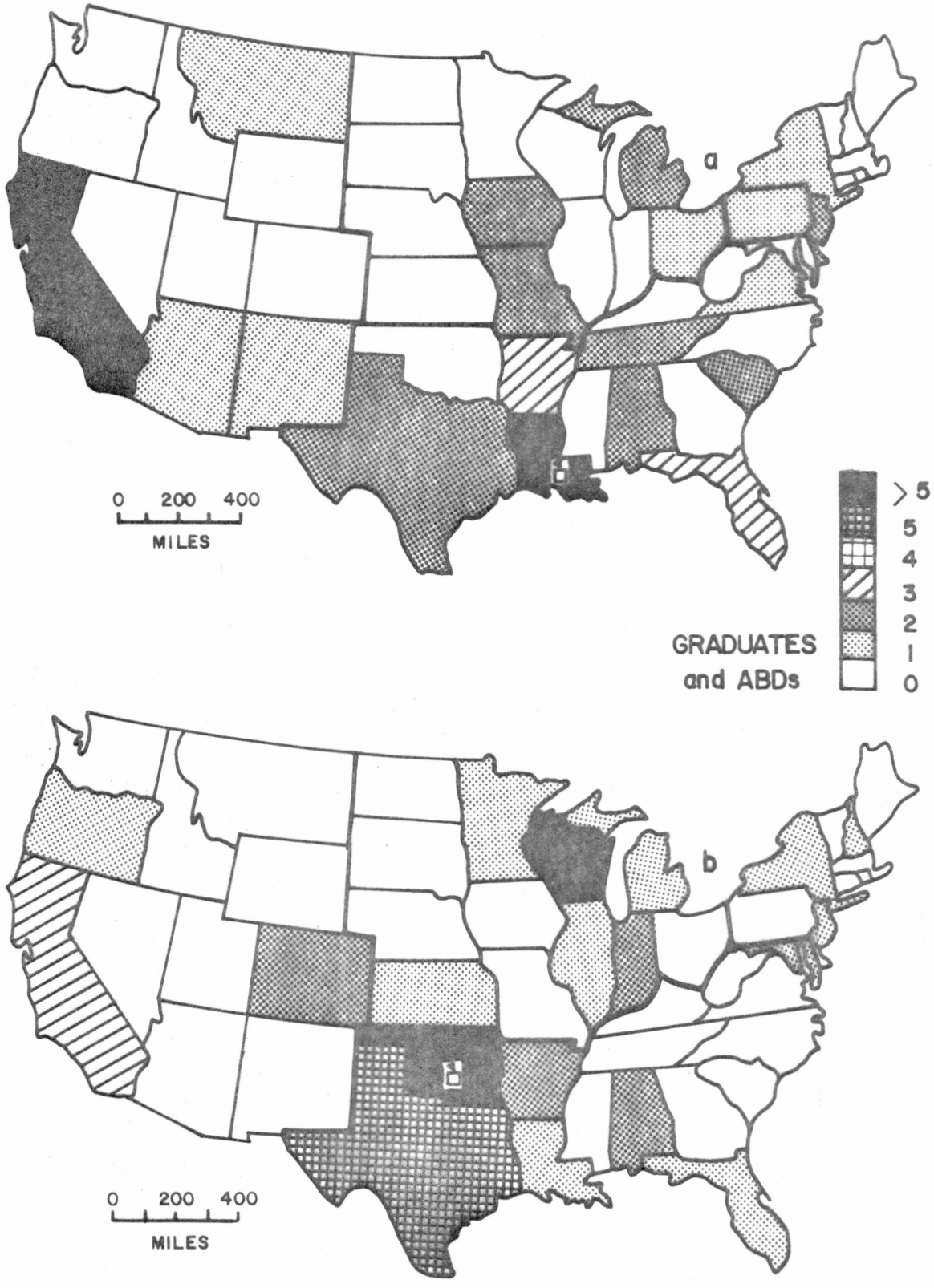

Figure 5. The Dispersal of Doctoral Geography Graduates and ABD Students from (a) Louisiana State University and (b) the University of Oklahoma

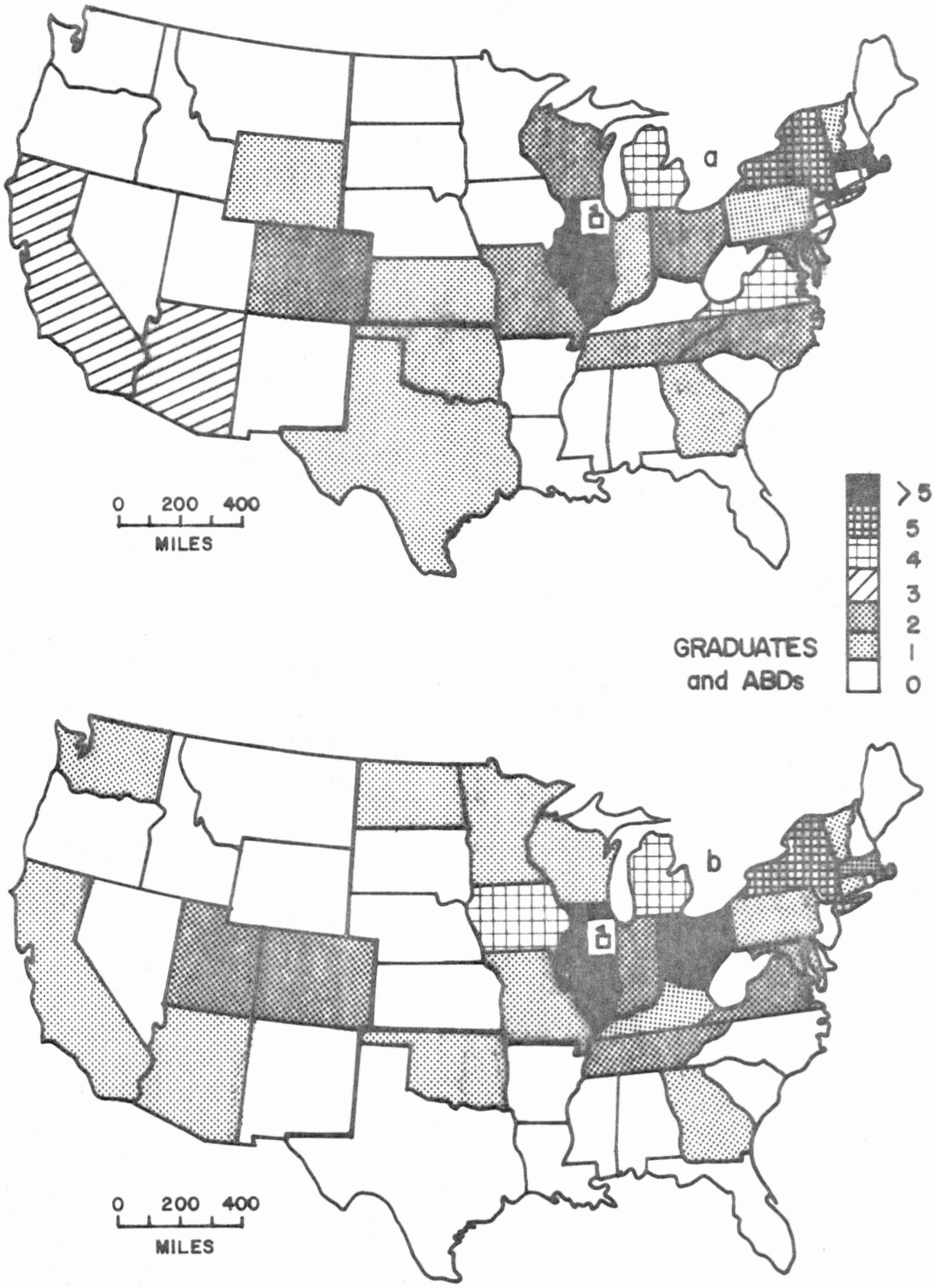

Figure 6. The Dispersal of Doctoral Geography Graduates and ABD Students from (a) the University of Chicago and (b) Northwestern University

The University of Illinois did not lead in any state. Illinois was classified as a regional university for geographic study because more than 58 percent of its graduates were in the North Central Region (see Figure 7a). Almost 50 percent were employed in the East-North Central Sub-Region.

Indiana University was classified as a national university because more than 50 percent of Indiana's trained geographers were employed outside the North Central Region. Most, however, were located relatively close to the Bloomington campus.

Figure 7b illustrates the dispersion of geography graduates and ABD students from Ohio State University. Ohio State was classified as a national university. Although most of the graduates remained east of the Mississippi River, each of the four census regions were well represented. Ohio had the largest number of Buckeye graduates, and California was second.

The University of Michigan and Michigan State University tied for the leadership in Michigan. Both were classified as national universities. The University of Michigan had a large concentration in California, Washington, and Pennsylvania (see Figure 8a). Michigan State University had few graduates and ABD students in the West, but a large concentration was in the South (see Figure 8b).

The University of Wisconsin at Madison led in Wisconsin and Kansas (see Figure 9a). The university was classified as a regional university, but was very close to the national classification (see Table VIII). Relatively few graduates from the Madison campus were employed in the South, but the other regions were well represented.

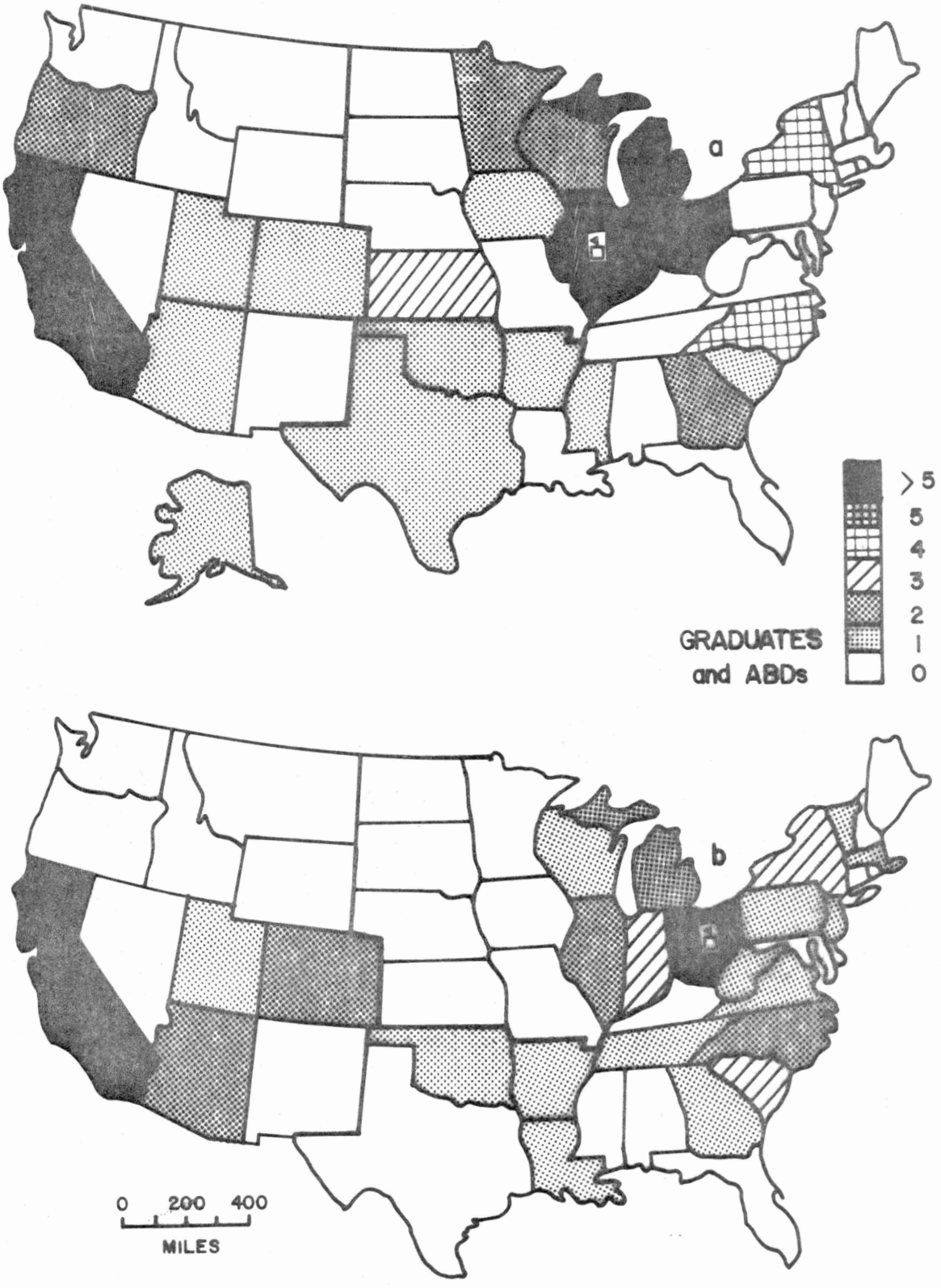

Figure 7. The Dispersal of Doctoral Geography Graduates and ABD Students from (a) the University of Illinois and (b) Ohio State University

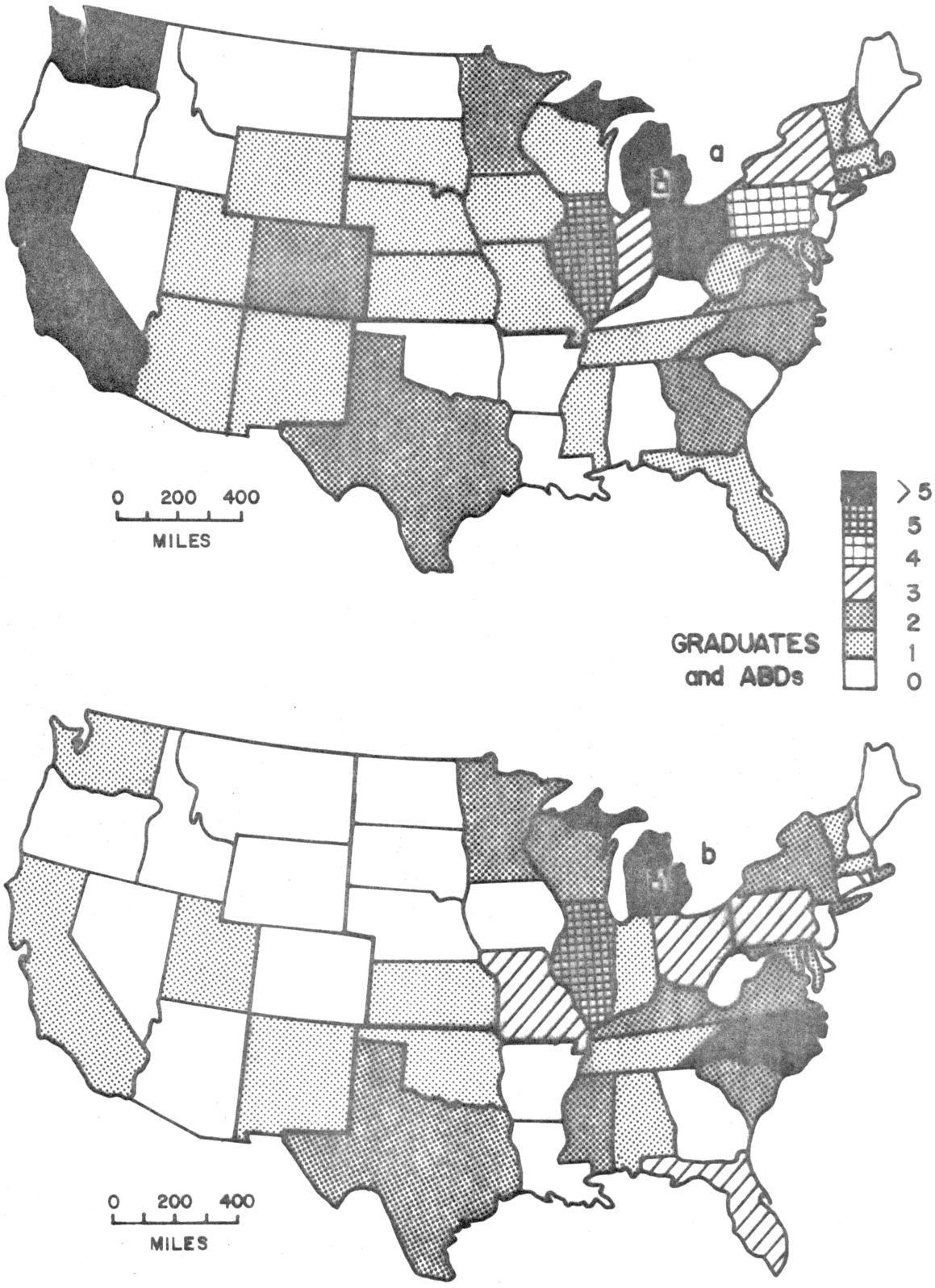

Figure 8. The Dispersal of Doctoral Geography Graduates and ABD Students from (a) the University of Michigan and (b) Michigan State University

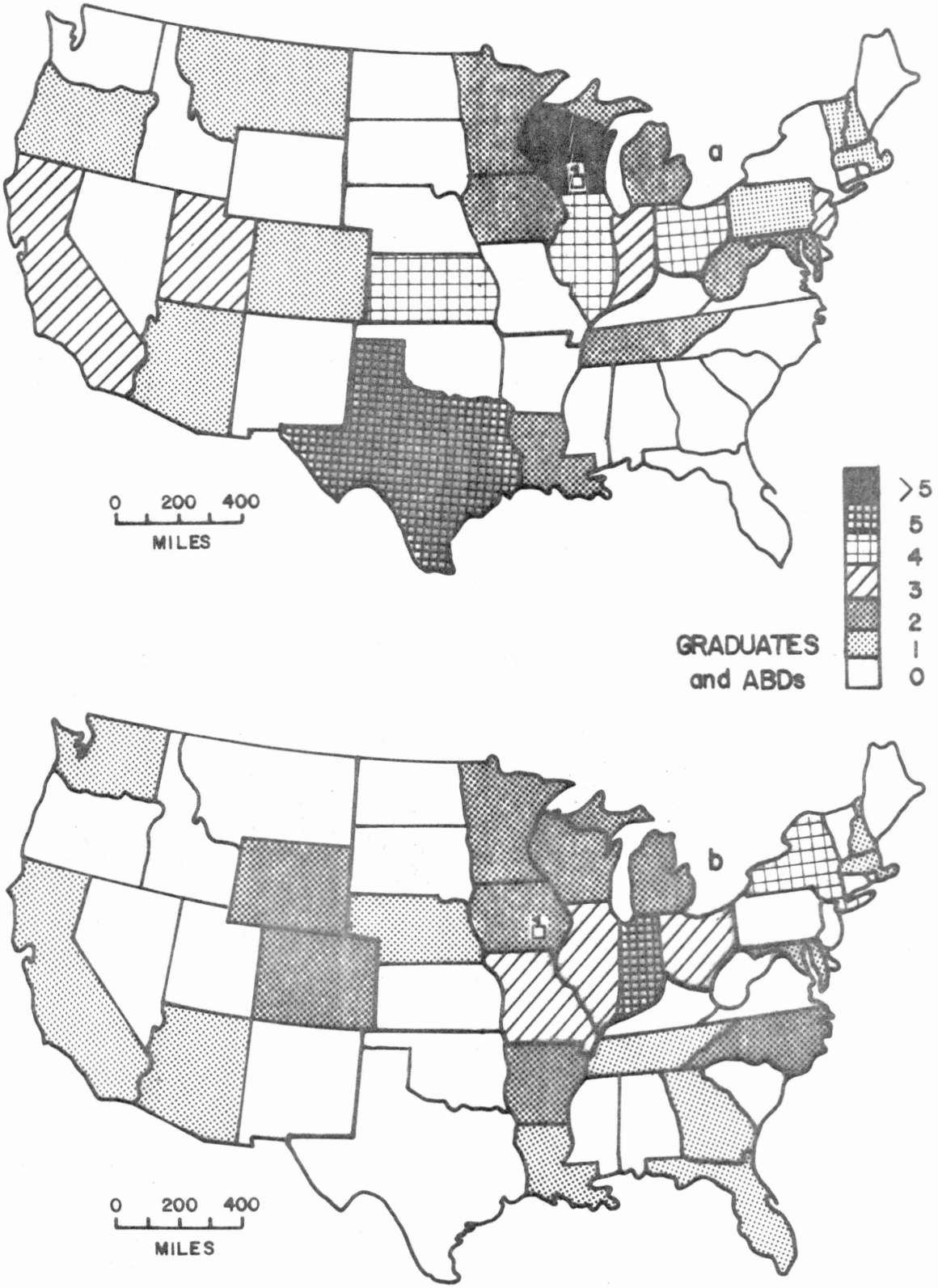

Figure 9. The Dispersal of Doctoral Geography Graduates and ABD Students from (a) the University of Wisconsin at Madison and (b) the University of Iowa

The University of Iowa was classified as a national university. The university had the largest number of graduates and ABD students in Wyoming. There were more graduates employed in other states than in Iowa (see Figure 9b). The University of Minnesota reflected the Middle West distribution pattern with over 57 percent of its doctoral graduates and ABD students in the North Central Region (see Figure 10a). Minnesota trained geographers led in Minnesota and Vermont.

The University of Nebraska at Lincoln was classified as a regional university. Most of its graduates were employed in the North Central Region (see Figure 10b). Nebraska led in Nebraska, Missouri, and Montana, although the largest concentration from Nebraska was in the state of Illinois.

The University of Kansas led in Hawaii and Utah. The university was classified as a national university for geographic study due to the dispersion of its graduates (see Figure 11a). There were more graduates from the University of Kansas in Illinois and New York than in any other states.

Other doctoral bestowing universities in the North Central Region that could not be classified due to the lack of data included Southern Illinois University, the University of Cincinnati, Kent State University, and the University of Wisconsin at Milwaukee.

The University of Colorado was classified as a national university, although there were only 19 graduates represented in this research. The Colorado trained geographers did not lead in any state, but were tied for the leadership in Colorado.

U.C.L.A. was classified as a regional university although a large number of graduates and ABD students were employed in other areas

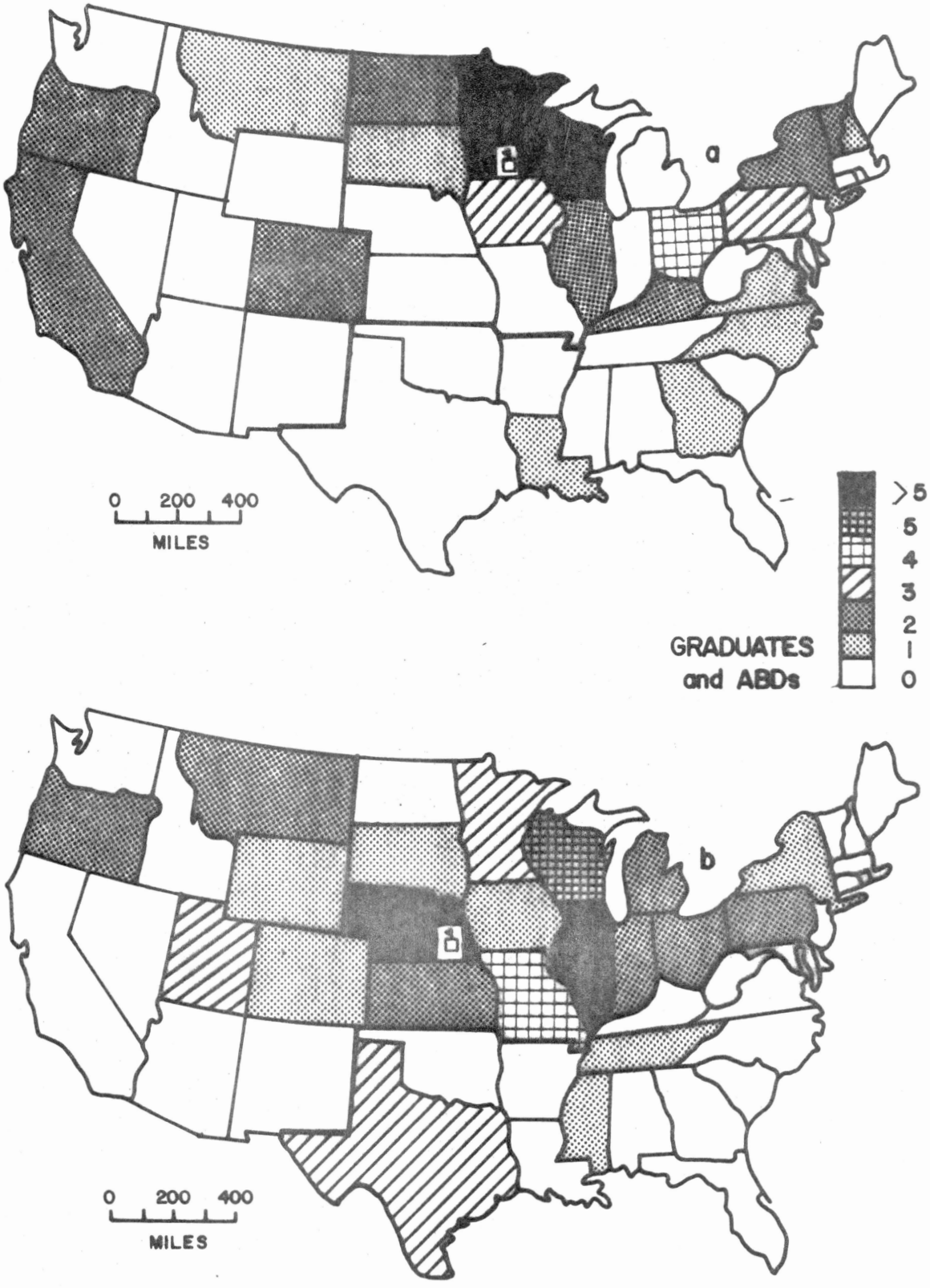

Figure 10. The Dispersal of Doctoral Geography Graduates and ABD Students from (a) the University of Minnesota and (b) the University of Nebraska at Lincoln

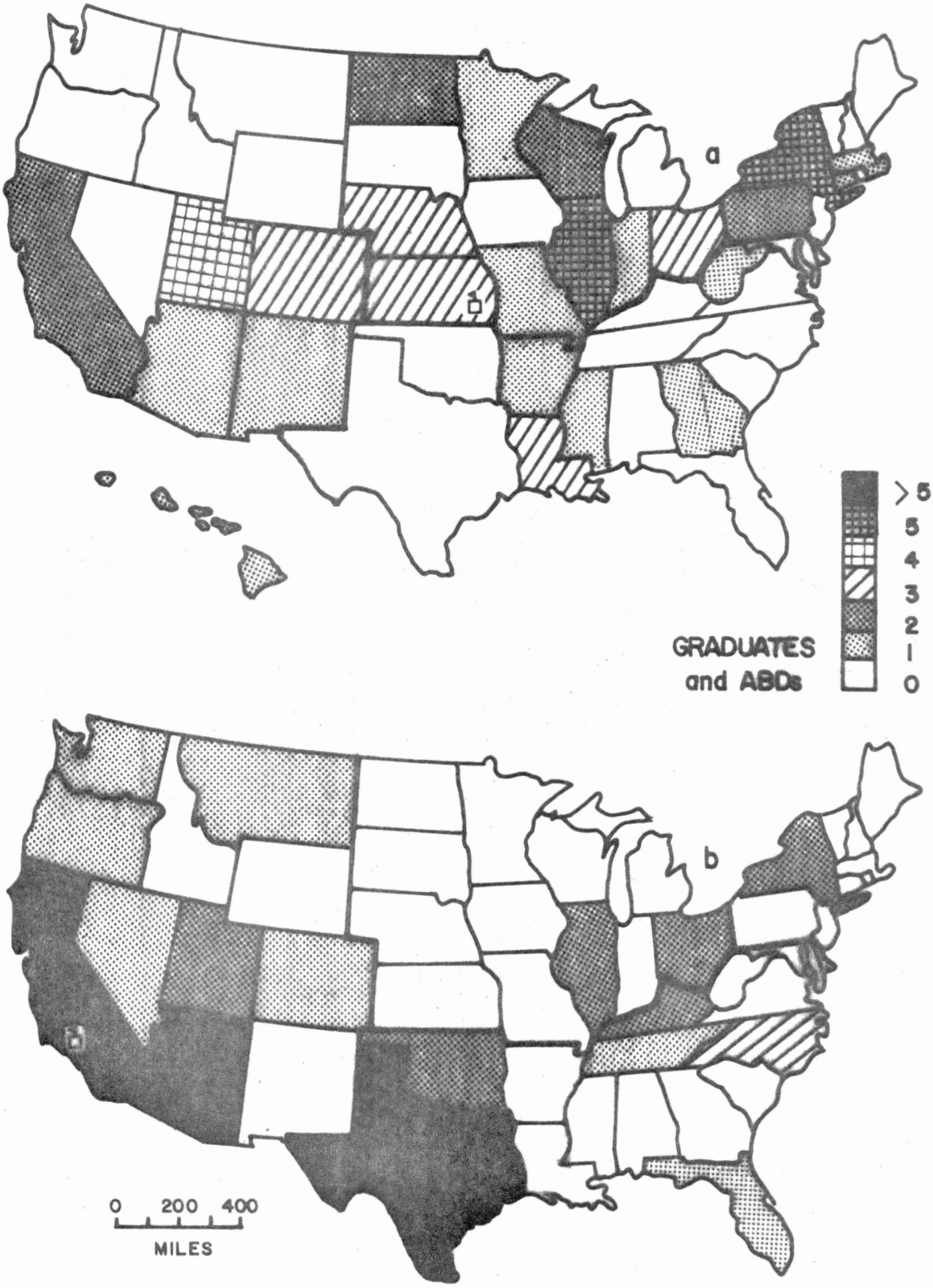

Figure 11. The Dispersal of Doctoral Geography Graduates and ABD Students from (a) the University of Kansas and (b) U.C.L.A.

of the country (see Figure 11b). U.C.L.A. doctoral graduates and ABD students led in Arizona, California, Nevada and Texas. Twenty (36 percent) remained in California, and 60 percent were employed in the West.

The University of California at Berkeley was classified as a national university. The university led only in Delaware. The largest number of graduates and ABD students, however, remained in California (see Figure 12a). Many others migrated to the North Central and Northeast regions for academic positions.

The University of Oregon was classified as a regional university because almost half of its trained geographers were employed in California. Four others were located in Oregon.

The University of Washington was classified as a national university (see Figure 12b). The university led only in Washington. Doctoral graduates and ABD students from the Seattle campus were widespread throughout the United States.

Other western doctoral campuses represented in this study but could not be classified due to insufficient representation included Arizona State University, the University of Arizona, the University of California at Davis, the University of California at Riverside, Northern Colorado University, the University of Hawaii, Oregon State University, and the University of Utah.

The relatively high percentage of geographers remaining within the same region as the bestowing doctoral program was similar to the findings of Marshall in his study of economists.[3] Berelson also noted

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[3]Marshall, The Mobility of College Faculties, p. 54.

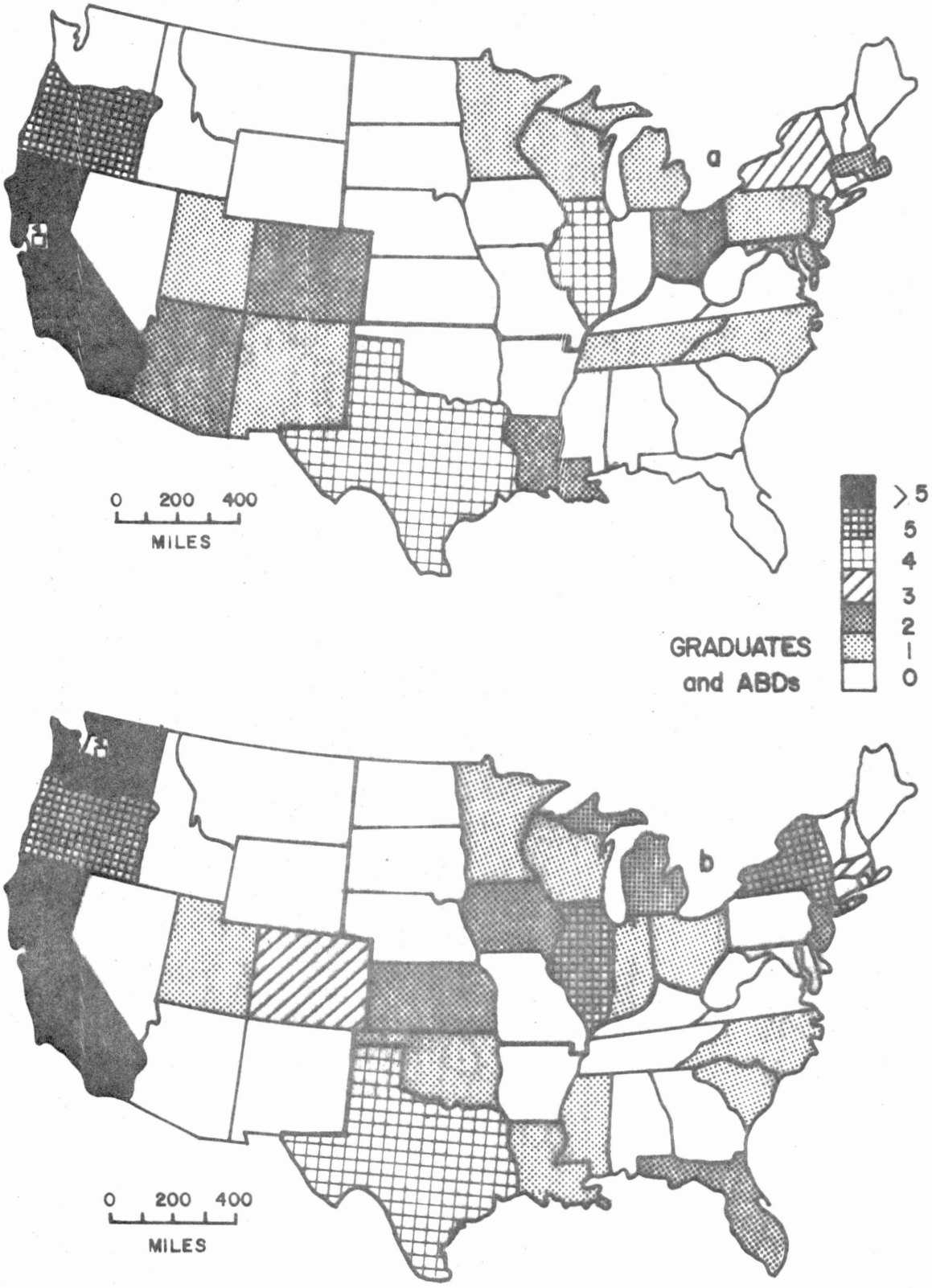

Figure 12. The Dispersal of Doctoral Geography Graduates and ABD Students from (a) the University of California at Berkeley and (b) the University of Washington

students tend to remain within the region in which the doctorate was granted.[4]

Thirteen of the 29 universities having 15 or more graduates represented in this study were classified as national departments for geographic study. Three were private universities and 10 were state supported. The University of Oklahoma was the only southern university obtaining the national classification.

Comparisons were made between Table VIII and the hierarchical listings presented in Chapter II to determine how many national departments were listed in the top 15 positions. Eleven of the 13 national departments were listed in the first 15 positions of the Doctoral Program Degree Points. The published rank-order systems had fewer nationally classified departments in the elite positions. The Sopher and Duncan study had 10, followed by the Roose and Andersen ranking and the Gourman study with nine each. The Beaumont rankings had seven of the 13 national departments in the top 15 positions.

Figure 13 illustrates the general sphere of influence for many universities, most of which were classified as regional. The name of the university that led in the number of doctoral graduates and ABD students in most states was identified within the borders. If the distance was not too far, arrows were drawn to the state dominated by a specific geography department.

The above spheres of influence also illustrate the general movement from areas of surplus production to regions of employment opportunity, or deficit production of doctoral geographers. If all the

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[4]Berelson, Graduate Education in the United States, p. 114.

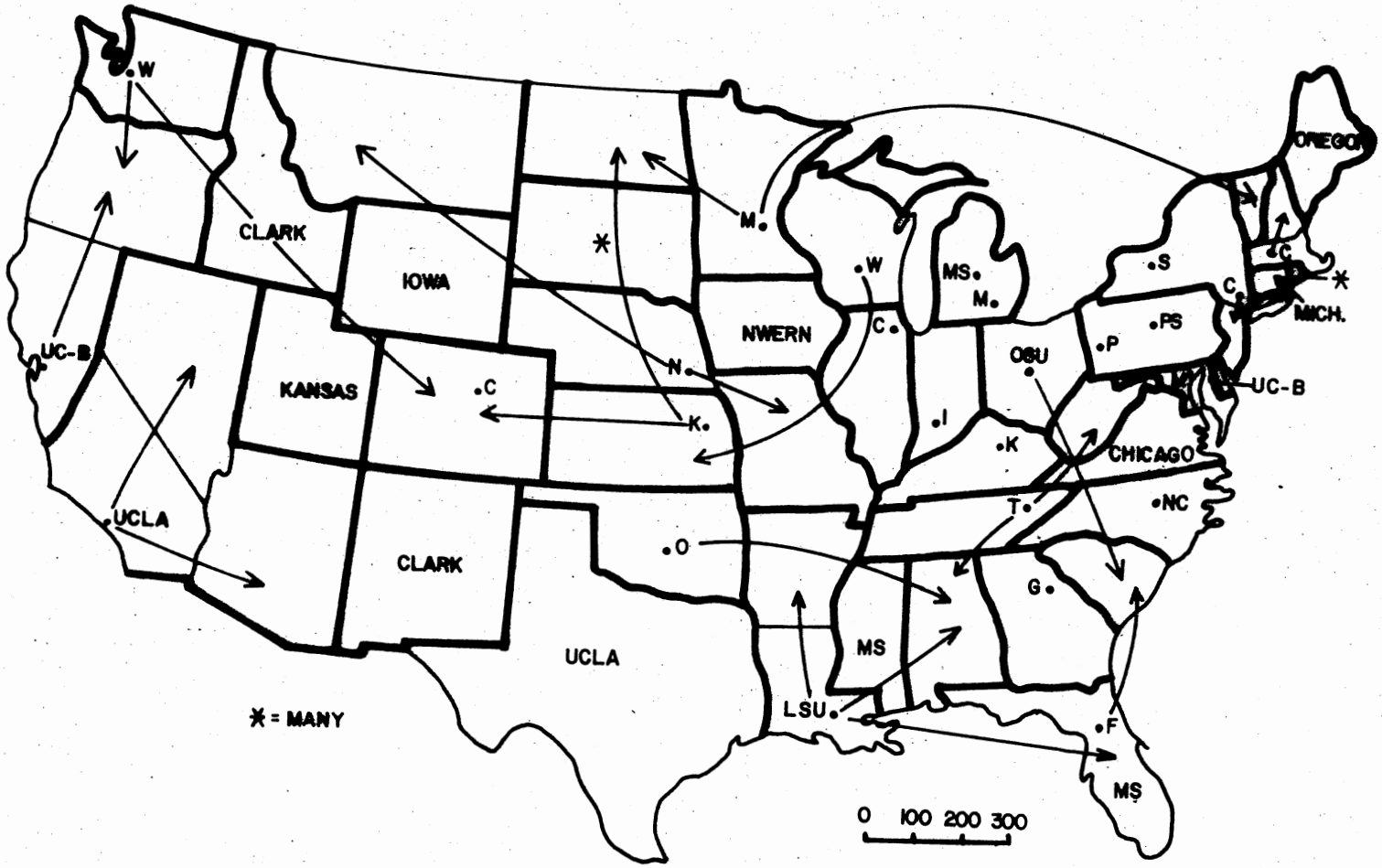

Figure 13. Selected Doctoral Geography Departments and Their Spheres of Influence, as Delineated by Employed Graduates and ABD Students

geography doctoral programs within one state (Michigan and Michigan State) were combined together to form a single column, different regional patterns became discernible (see Figure 14).

Several states led in the number of doctoral geographers and ABD students at home as well as in other states, including California, Illinois, Massachusetts, Michigan, and New York. The above states also had multiple doctoral programs for geographic study within their borders. Other states led only in the supply of doctoral graduates and ABD students in the home state, including Kentucky, Louisiana, Maryland, Minnesota, Nebraska, North Carolina, Oklahoma, and Tennessee. Only two of the latter list, Maryland and Oklahoma, had more than one doctoral geography department. None of the southern departments led in any state outside the southern region. Many of the above listed states were tied for the leadership in the number of doctoral graduates and ABD students in one or more other states.

The matrixes used to construct Figure 13 and Figure 14 were collapsed into fewer rows and columns. The universities were grouped together in census sub-regions to illustrate possible spheres of influence and possible suppliers and consumers of doctoral graduates and ABD students (see Table IX). The raw data for the table were converted into percentages for comparative purposes.

Nationally, slightly more than 36 percent of the graduates from universities within a specific sub-region remained within that region. The Middle Atlantic, East-North Central, West-North Central, and Pacific sub-regions had larger retention percentages than the national average. Only in the East-North Central Sub-Region was the retention rate greater than 50 percent. The East-North Central Sub-Region led in

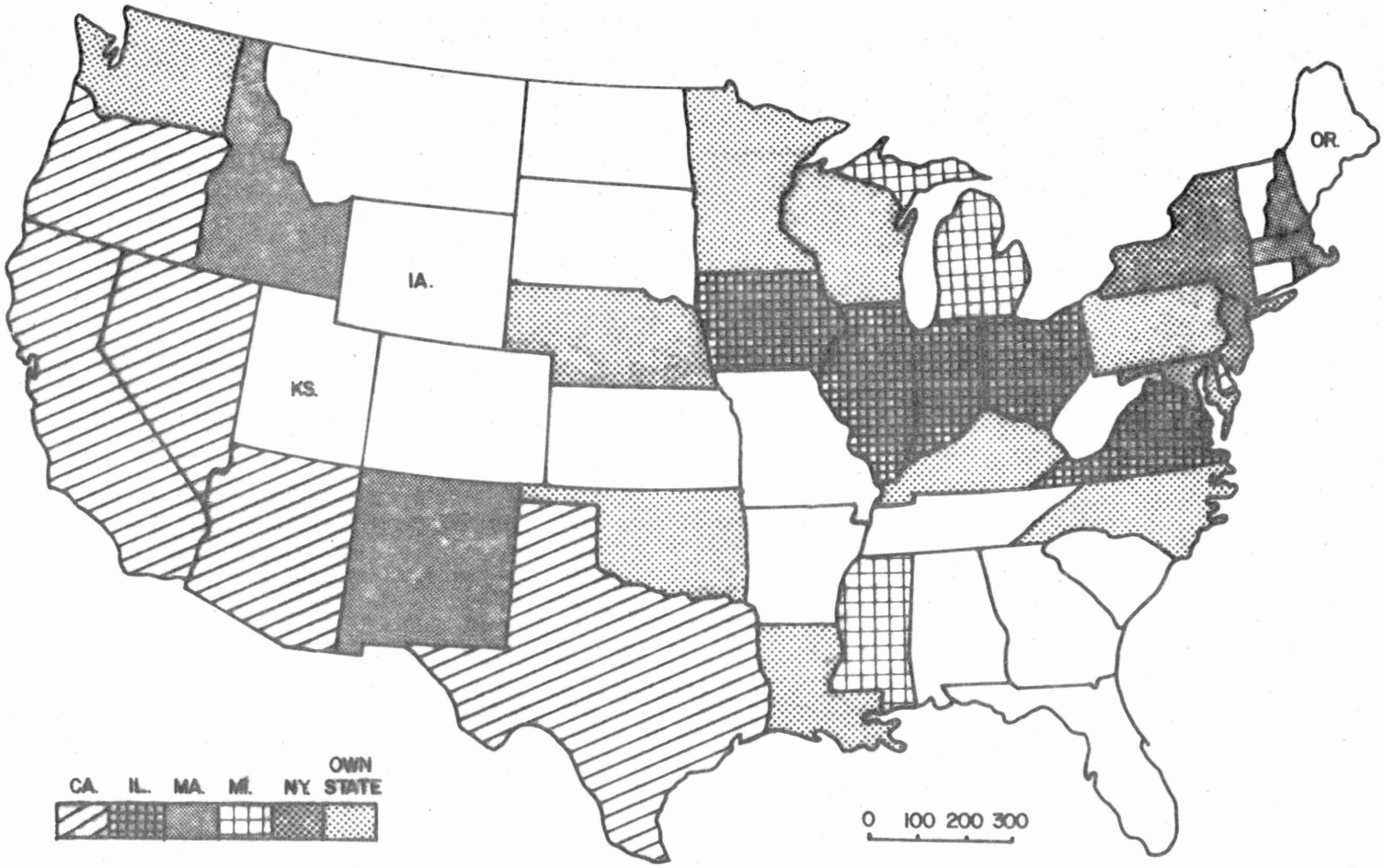

Figure 14. Major State Spheres of Influence as Delineated by Graduates and ABD Students from Doctoral Geography Departments

TABLE IX

RETENTION OF DOCTORAL GEOGRAPHERS AND ABD STUDENTS
BY CENSUS SUB-REGIONS
IN PERCENT

TO	FROM									Total
	N.E.	M.At	S.At	E-SC	W-SC	E-NC	W-NC	Mt.	Pac.	
New England	32.6	17.9	2.1	0.0	2.1	28.4	7.4	2.1	7.4	95
Middle Atl.	4.9	38.7	8.3	2.5	3.4	23.5	9.3	1.0	8.3	204
South Atl.	6.8	11.2	25.2	5.3	4.4	32.5	4.4	2.4	7.8	206
E-S Central	5.5	4.1	6.9	20.5	9.6	32.9	8.2	4.1	8.2	73
W-S Central	4.8	8.1	4.0	1.6	29.8	21.8	10.5	0.8	18.6	124
E-N Central	3.7	7.0	4.3	1.9	4.5	54.4	14.9	2.1	7.2	375
W-N Central	5.1	4.4	0.7	2.2	8.1	32.1	36.5	5.8	5.1	137
Mountain	5.8	7.4	4.1	0.8	5.0	30.6	19.8	5.8	20.7	121
Pacific	3.9	10.4	5.5	0.0	6.6	24.7	6.6	1.1	41.2	182
Total Employed In:	100	192	113	44	108	523	196	38	203	1,517

supplying geographers to four of the nine sub-regions and was second in the remaining five sub-regions. The Pacific Sub-Region had more than a 41 percent retention rate. Most of the other regions had a retention rate between 30 and 39 percent.

Summary

Spheres of influence by doctoral granting geography departments in the United States were constructed. The initial spheres were determined by a matrix, where columns represented the graduates from a specific graduate program and rows represented the states where graduates were employed. It was noted there were two basic types of doctoral geography departments, regional and national. Regional

departments were those that had more than half the graduates employed within the region in which the bestowing department was located. National departments were those that illustrated relatively wide dispersal of their respective graduates across the country. In several instances, a nationally classified university did not lead in the number of employed geographers in any state. An example was Syracuse University. There were 16 regional departments and 13 national bestowing departments. Those geography departments with less than 15 graduates participating in this study were not included in either classification.

A second matrix was constructed, similar to the above, but where states with doctoral programs made up the column data. The rows represented the employing locations. Most states with more than one doctoral geography department became dominant, such as Illinois and California. Regionalization became more apparent, and a general pattern of the census sub-regions was visible. Because of the latter, a third matrix was constructed with the sub-regions listed in the columns and rows. The latter matrix identified sub-regions that supplied the largest number of geographers to other sub-regions. The matrix illustrated "import-export" patterns for geographers. The East-North Central Sub-Region not only was the major producer of doctoral geographers, but was also the major consumer of the product.

CHAPTER IV

INBREEDING PATTERNS WITHIN GEOGRAPHY DEPARTMENTS IN INSTITUTIONS OF HIGHER EDUCATION

Introduction

Past research on faculty inbreeding patterns and characteristics in higher education in the United States primarily focused on institutional patterns without reference to disciplinary divisions. Past research on inbreeding did not center on a specific discipline, which makes the current study unique. Some scholars react negatively to the term "inbreeding," unless their school is highly inbred or the scholars themselves are graduates of inbred departments. Such reactions were freely forwarded to the researcher on returned questionnaires. Suggestions on how to further pursue and to evaluate the current research problem were also voluntarily written on several returned questionnaires. Many of the suggestions have been incorporated into this study.

It is difficult to compare the inbred faculty and the departmentally inbred staff characteristics and patterns with other fields of knowledge because of the lack of similar research by other disciplines. The comparisons that can be made are very general, and most of the generalizations are made with sociology and economics. Such comparisons primarily refer to doctoral granting departments.

Many comparisons in this study, therefore, are made between geography departments grouped within the four census regions as delineated in Table I, and between similar programs (bachelor, master, or doctor). Secondly, comparisons are also made between institutions that receive state appropriations and those colleges and universities controlled by church, private, municipal, or federal agencies. This chapter will concentrate on the faculty and departmental inbreeding characteristics and patterns of geographers in institutions of higher education offering the baccalaureate, master's, or doctor's degree. The baccalaureate college or university need not offer a major or minor in geography, but must have geographic work within its curriculum.

Participating Institutions

The returned data obtained from questionnaires mailed in November, 1976, were numerically coded. The data were punched on computer cards for sorting and evaluative purposes. The returned data represented 433 institutions of higher education in the United States: 304 baccalaureate, 78 master's, and 51 doctoral departments. The largest number of participating institutions, 322 colleges and universities (74 percent), were state supported. There were 56 schools (13 percent) that were classified as private colleges, and 45 colleges and universities (11 percent) that were church controlled. Eight schools were municipally controlled, and two were federally supported institutions. Table X presents the sectional distribution of the participating institutions of higher education in the United States that returned the questionnaires and supplied the data for this study.

TABLE X

REGIONAL DISTRIBUTION OF COLLEGES AND UNIVERSITIES PARTICIPATING IN THIS STUDY

Section	Control										Total	Percent
	State			Church		Private		Municipal		Federal		
	B	M	D	B	M	B	D	B	D	B		
North-east	41	11	3	5	0	18	6	5	0	1	90	20.79
South	78	23	13	17	0	8	0	1	0	0	140	32.33
North Central	56	29	13	21	0	21	2	1	1	0	144	33.26
West	29	14	12	1	1	0	1	0	0	1	59	13.62
Totals:	204	77	41	44	1	47	9	7	1	2	433	100.00

B = Baccalaureate; M = Master; D = Dorctoral Programs

Approximately 64 percent of the colleges and universities that participated in this study were located east of the Mississippi River. About 33 percent of all participating institutions were in the North Central Region; another one-third were located in the South. Further, 54 percent of the participating colleges and universities were located in an area extending from the high plains states through the Northeast and north of the Ohio River, representing an area which closely corresponds to the major population area of the country. The South led all areas in the total number of state colleges and universities bestowing the baccalaureate degree (78), followed by the North Central states (56), and the Northeast (41). The West had 29.

The North Central Region led the nation in state supported geography departments bestowing the master's degree with 29, followed

by the South (23), and the West with 15. The Northeast had 11 master's degree bestowing departments, all state supported.

The North Central Region had 16 participating universities that bestowed the doctoral degree for geographic study, followed by the South and West regions with 13 each. There were nine in the Northeast. Thus, the distribution of the doctoral departments does not follow the population distribution since less than half were in the Northeast and North Central regions of the United States. However, there were 29 (57 percent) doctoral geography programs east of the Mississippi River that participated in this research.

The Northeast was the leading concentration for private colleges and universities with 43 percent, closely followed by the North Central with 41 percent. Thus, 84 percent of the private geography departments were in the major population area of the country. The Northeast had two-thirds of the private doctoral programs. Two of the remaining three were in the Chicago area; the other was in Denver. A similar concentration (47 percent) of the church controlled colleges and universities were located in the North Central Region. Geography is emphasized in many Lutheran controlled schools in the upper Mid-West, such as the Concordia colleges in Illinois, Minnesota, and Nebraska, as well as Valparaiso University in Indiana. The South was a close second with 38 percent. Therefore, 85 percent of the church controlled schools offering geographic instruction were located in the North Central and South regions. The only graduate program offered by a church supported university was a master's degree for geographic study in the West.

Five of the seven municipally controlled colleges were in New York City. The remaining two were in the District of Columbia and St. Louis.

One municipally controlled university in the North Central Region has a doctoral program in geography. Two of the three major federal academies of the country also participated in this study.

Inbreeding Patterns and Characteristics of Colleges and Universities

Introduction

The number of colleges and universities that had one or more of their own graduates as full time teachers in geography departments was relatively low (see Table XI). There were 128 faculty inbred departments out of the 433 that participated in this study, slightly less than 30 percent. There was a wide variation in the number of inbred departments between the different controlling agencies as well as between the colleges and universities offering the same degree program. The private colleges and universities were the least inbred, followed by state, church, municipal, and federal colleges and universities. The state baccalaureate institutions were least inbred, followed by the baccalaureate private colleges. Excluding the military academies, church supported baccalaureate colleges were the most inbred in the baccalaureate group. However, the highest inbred group was the state supported doctoral geography departments (71 percent). The characteristics and patterns of inbreeding for doctoral departments will be presented first, followed by similar characteristics within the master's degree programs and the baccalaureate geography departments.

TABLE XI

A COMPARISON BETWEEN THE NUMBER OF INBRED GEOGRAPHY PROGRAMS AND THE TOTAL NUMBER OF GEOGRAPHY PROGRAMS

Section	Control: State						Control: Church			
	Bachelor		Master's		Doctor's		Bachelor		Master's	
	Inb. Pgm.	Tot. Pgm.	Inb. Pgm.	Tot. Pgm.	Inb. Pgm.	Tot. Pgm.	Inb. Pgm.	Tot. Pgm.	Inb. Pgm.	Tot. Pgm.
Northeast	11	41	4	11	0	3	1	5	0	0
South	11	78	8	23	8	13	3	17	0	0
North Central	7	56	17	29	11	13	11	21	0	0
West	3	29	4	14	10	12	0	1	1	1
Totals:	32	204	33	77	29	41	15	44	1	1
Percent:	15.69		42.86		70.73		34.00		100.00	
Total Control Percent:	29.19						35.56			

Section	Control: Private				Control: Municipal				Federal	
	Bachelor		Doctor's		Bachelor		Doctor's		Bachelor	
	Inb. Pgm.	Tot. Pgm.	Inb. Pgm.	Tot. Pgm.	Inb. Pgm.	Tot. Pgm.	Inb. Pgm.	Tot. Pgm.	Inb. Pgm.	Tot. Pgm.
Northeast	3	18	2	6	1	5	0	0	1	1
South	1	8	0	0	1	1	0	0	0	0
North Central	4	21	2	2	0	1	1	1	0	0
West	0	0	1	1	0	0	0	0	1	1
Totals:	8	47	5	9	2	7	1	1	2	2
Percent:	17.02		55.56		28.57		100.00		100.00	
Total Control Percent:	23.21				37.5				100.00	

Faculty Inbred Departments

Doctoral Programs. A geography department was classified as faculty inbred if one or more members of the full time teaching staff was a graduate of the university in which the geographer was offering geographic instruction. All sections of the United States had state supported doctoral programs in geography, but only the Northeast lacked a faculty inbred department. There were 29 faculty inbred departments out of 41 participating programs (71 percent). The regional percentages ranged from zero in the Northeast to almost 85 percent in the North Central and 83 percent in the West. More than 81 percent of the doctoral programs west of the Mississippi River were inbred, while 60 percent east of the river had one or more of their own graduates on the geography staff.

Although 71 percent of the state supported doctoral geography departments were inbred, only 17 percent of the faculty were inbred. Table XII presents the number of inbred and the total number of geographers employed by state supported doctoral departments. Almost 22 percent of the geographers in the western universities were inbred, while none in the Northeast were similarly classified. The West data could be misleading in that half of the inbred geographers were employed by a single department.

Five of the nine private doctoral degree granting geography departments were classified as faculty inbred. The South lacked representation. There were two inbred departments in the Northeast, two in the North Central Region, and one in the West. All departments in the North Central and West were inbred, while four in the Northeast were

TABLE XII

A COMPARISON BETWEEN THE INBRED AND THE TOTAL FACULTY AT STATE SUPPORTED GEOGRAPHY DEPARTMENTS BESTOWING THE DOCTORAL DEGREE

Section	Number of Inbred Faculty	Number of Total Faculty	Percent Inbred
Northeast	0	34	0.00
South	22	118	18.64
North Central	23	150	15.33
West	28	124	22.58

not. The percentage of private inbred doctoral granting universities was expected to be greater than the percentage for publicly supported inbred geography departments bestowing the same degree. The data do not support the assumption: 71 percent for state universities and 56 percent for private institutions. The percentages may be misleading, however, because there are fewer number of private universities that bestow the doctoral degree.

Table XIII presents a comparison between the number of inbred and the total faculty teaching in private doctoral geography departments. The highest percentage for inbreeding was in the North Central and West regions. The Northeast had the lowest inbred rate. Although more than half of the private geography departments offering the doctoral program were classified as faculty inbred, less than one in five (20 percent) of the staff were inbred. This was slightly more than two percent above the national average for inbred faculty in state supported doctoral geography programs.

TABLE XIII

A COMPARISON BETWEEN INBRED AND NONINBRED FACULTY AT PRIVATE UNIVERSITIES BESTOWING THE DOCTORAL DEGREE IN GEOGRAPHY

Section	Number of Inbred Faculty	Number of Total Faculty	Percent Inbred
Northeast	6	43	13.95
North Central	5	16	31.25
West	2	7	28.57
Totals:	13	66	19.70

The only university that was municipally controlled that offered the doctoral program was classified as inbred. One of the seven geographers was a graduate of the university. All of the teaching staff were graduates of universities in the Northeast and North Central regions.

To determine whether the distribution of inbred faculty employed in state supported doctoral geography departments was significant, the chi-square test was administered. The following hypotheses were presented:

H_o: There is no difference between regions in the proportion of inbred geographers employed at state supported doctoral granting geography departments.

H_1: There is a difference between regions in the proportion of inbred geographers employed at state supported universities bestowing the doctoral degree.

There were 426 geographers employed in state supported doctoral programs that participated in this research, and 73 were classified as faculty inbred. A chi-square value of 7.82 would be significant at the

five percent level with three degrees of freedom. The calculated chi-square value was 8.35. Therefore, the null hypothesis must be rejected (see Table XIV). The acceptance of the research hypothesis suggests that a regional difference does exist. The Northeast lacked a single inbred faculty member while the West had a higher number of inbred faculty than was expected. The North Central and South had approximately the same number of inbred geographers that were expected.

TABLE XIV

CHI-SQUARE TEST OF THE DISTRIBUTION OF INBRED FACULTY AT STATE SUPPORTED UNIVERSITIES BESTOWING THE DOCTORAL DEGREE IN GEOGRAPHY

	Region				Total
	Northeast	South	North Central	West	
Noninbred Doctoral Faculty	34	96	127	96	353
OB Inbred Doctoral Faculty	0	22	23	28	73
EX Inbred Doctoral Faculty	5.8	20.2	25.7	21.3	73

$X^2 = 8.35$

The chi-square test for significance was not administered to data for private universities bestowing the doctoral degree for geographic study because some cells would have expected values less than five. The test was used to compare the inbred state and private doctoral faculty (see Table XV). The hypotheses on page 68 are appropriate by substituting private for state. The null hypothesis could not be rejected because the calculated chi-square value was 0.084. Another

TABLE XV

CHI-SQUARE TEST OF THE PROPORTION OF INBRED FACULTIES BETWEEN THE DOCTORAL DEPARTMENTS OF STATE AND PRIVATE UNIVERSITIES

Controlling Agency	Number of Faculty		X^2
	Inbred	Noninbred	
Total Private Faculty	13	53	0.084
Total State Faculty	73	353	

comparison found no significant difference in the proportion of inbred staff between the private and state doctoral programs.

Master's Programs. There were 33 faculty inbred state supported departments out of 77 (43 percent) that participated in this research (see Table XVI). The areas west of the Mississippi River had 14 faculty inbred departments out of 26 (54 percent) as compared to the 37 percent (19 of 51 programs) east of the river. Over half of the master's degree bestowing geography departments (40), or 52 percent, were located in the North Central and Northeast regions of the nation, and 52 percent of those departments were classified as faculty inbred.

Most of the inbred state supported master's degree granting geography departments had but one or two geographers that were inbred. Table XVII presents a comparison between the number of inbred faculty and the total number of geographers employed in master's degree programs, by regions. Less than 10 percent of the geographers were inbred. There was a slight variation between the four regions. The North

TABLE XVI

NUMBER OF INBRED PROGRAMS AT STATE SUPPORTED MASTER'S DEGREE GRANTING UNIVERSITIES AND COLLEGES

Region	Number of Inbred Programs		Percent Inbred
Northeast	4	11	36.36
South	8	23	34.78
North Central	17	29	58.62
West	4	14	28.57
Totals:	33	77	42.86

TABLE XVII

A COMPARISON BETWEEN THE INBRED AND THE TOTAL FACULTY AT STATE SUPPORTED COLLEGES AND UNIVERSITIES BESTOWING THE MASTER'S DEGREE

Region	Number of Inbred Faculty	Total Faculty	Percent Inbred Faculty
Northeast	7	68	10.29
South	14	158	8.86
North Central	27	249	10.84
West	7	106	6.60
Totals:	55	581	9.47

Central Region had the highest number of inbred geographers, but also the largest number of geographers.

Almost 43 percent of the geographers teaching in master's degree granting institutions were in the North Central Region of the United States. Slightly less than half (49 percent) of the inbred geographers were also employed in the same region. The South was second with 14 inbred geographers. The Northeast and West had seven inbred geographers each. The validity of the West, however, was questionable due to the lack of response from four large universities in California and another in Washington.

The chi-square test was used to determine whether the regional distribution was significant. The following hypotheses were presented:

H_o: There is no difference between regions in the proportion of inbred geographers employed at state supported master's degree bestowing geography departments.

H_1: There is a difference between regions in the proportion of inbred geographers at state supported colleges and universities bestowing the master's degree.

With three degrees of freedom, the chi-square value of 7.82 would be significant at the five percent level. The calculated chi-square was 1.53 (see Table XVIII). The null hypothesis must be accepted.

Only one church supported geography department bestowing the master's degree returned the questionnaires. The university was classified as faculty inbred because five of the seven staff members had received the baccalaureate degree from the school. Six of the staff had the doctoral degree, and the seventh member was classified ABD. None of the seven geographers were from the same doctoral program.

TABLE XVIII

CHI-SQUARE TEST OF THE DISTRIBUTION OF INBRED GEOGRAPHERS EMPLOYED BY STATE SUPPORTED MASTER'S DEGREE GRANTING INSTITUTIONS

	Region				Total
	Northeast	South	North Central	West	
Noninbred Faculty	61	144	222	99	526
OB Inbred Faculty	7	14	27	7	55
EX Inbred Faculty	6.4	15.0	23.6	10.0	55

$X^2 = 1.53$

Baccalaureate Programs. The number of state supported faculty inbred departments in baccalaureate colleges and universities ranged from three in the West to a high of 11 in the Northeast and South (see Table XIX). When comparing the number of inbred geography departments with the number of baccalaureate programs, the Northeast had a 27 percent inbred rate. The South was a distant second with 14 percent. The North Central Region had a 12.5 percent inbred rate, and the West was lowest with 10 percent.

Most inbred geography departments had a higher percentage of inbred faculty than the seven percent national average. One department had four inbred geographers, which was the highest number of inbred staff for any baccalaureate department. Five departments had half of their staff classified as inbred, and four were located in the South. The Northeast had nine percent of its baccalaureate faculty inbred, which was the highest of the four regions, but only slightly above the national average (see Table XX). The other regions had inbred percentages close to the national mean.

TABLE XIX

INBRED GEOGRAPHY PROGRAMS IN STATE SUPPORTED BACCALAUREATE INSTITUTIONS

Region	Number of Inbred Programs		Percent Inbred
Northeast	11	41	26.83
South	11	78	14.10
North Central	7	56	12.50
West	3	29	10.35
Totals:	32	204	15.69

TABLE XX

INBRED FACULTY MEMBERS IN BACCALAUREATE STATE COLLEGES AND UNIVERSITIES

Region	Number of Inbred Faculty	Total Faculty	Percent Inbred Faculty
Northeast	15	172	8.72
South	15	223	6.73
North Central	9	164	5.49
West	4	95	4.21
Totals:	43	654	6.58

To ascertain whether the sectional distribution of inbred faculty was significant, the chi-square test was administered. The following hypotheses were presented:

H_o: There is no difference between regions in the proportion of inbred geographers employed at state supported baccalaureate degree granting geography departments.

H_1: There is a difference between regions in the proportion of inbred geographers employed at state supported baccalaureate degree granting geography departments.

A chi-square value of 7.82 would be significant at the five percent level of confidence with three degrees of freedom. The calculated chi-square value for the data was 2.30 (see Table XXI). Thus, the null hypothesis could not be rejected.

TABLE XXI

CHI-SQUARE TEST OF THE DISTRIBUTION OF INBRED FACULTY AT STATE SUPPORTED COLLEGES AND UNIVERSITIES BESTOWING THE BACHELOR'S DEGREE IN GEOGRAPHY

	Region				Total
	Northeast	South	North Central	West	
Noninbred Bacc. Faculty	157	208	155	91	611
OB Inbred Bacc. Faculty	15	15	9	4	43
EX Inbred Bacc. Faculty	11.3	14.7	10.8	6.2	43

$X^2 = 2.30$

Table XXII presents a summary of the regional distribution of inbred programs in church supported baccalaureate institutions of higher education. The North Central Region had 11 inbred departments, or 73 percent of the national total. The South was a distant second with 20 percent, and the Northeast had seven percent of the inbred departments.

There were six Lutheran colleges, four Roman Catholic schools, and one college from each of the following religions: Adventist,

TABLE XXII

INBRED GEOGRAPHY PROGRAMS IN CHURCH SUPPORTED BACCALAUREATE COLLEGES AND UNIVERSITIES

Region	Number of Inbred Programs	Number of Total Programs	Percent Inbred Programs
Northeast	1	5	20.00
South	3	17	17.65
North Central	11	21	52.38
West	0	0	0.00
Totals:	15	44	34.41

Baptist, Church of Christ, Presbyterian, and Reformed Church. All of the Lutheran and two of the Catholic institutions participating in this research were located in the North Central Region. The Lutheran colleges were in Illinois (two), Indiana, Iowa, Nebraska, and South Dakota, and the two Catholic colleges were in Minnesota and Wisconsin. The other participating Catholic schools were in Pennsylvania and Texas. The two other southern church supported colleges were in Arkansas (Church of Christ) and Florida (Baptist). The Adventist and the Reformed colleges were in Michigan, and the Presbyterian college was in Wisconsin.

Table XXIII summarizes the number of inbred faculty. Eighteen of the 71 geographers were inbred. The large concentration of inbred programs in the North Central Region resulted in that area having the largest number of inbred faculty. Data were insufficient to use the chi-square test to examine the significance of the regional distribution of inbred church faculty.

TABLE XXIII

INBRED FACULTY MEMBERS AT CHURCH SUPPORTED BACCALAUREATE INSTITUTIONS

Region	Number of Inbred Faculty	Number of Total Faculty	Percent Inbred Faculty
Northeast	1	6	16.67
South	4	23	17.39
North Central	13	41	31.71
West	0	1	0.00
Totals:	18	71	25.35

Most of the 47 privately supported baccalaureate colleges that participated in this study were located from the Rocky Mountains eastward to the Atlantic Ocean and north of the Ohio River. Thirty-nine of the 47 (83 percent) colleges were in the above mentioned area, and 35 were east of the Mississippi River. The South had eight private colleges, and the West lacked representation. Land-grant institutions were being established at the approximate time settlement was taking place in the West. The major concentration of private colleges mentioned above were developed when industrial wealth was available to establish such colleges. Many small church and private colleges were established prior to the enactment of land-grant colleges by the United States Congress in 1862. Private endowments were made for the support of most private colleges by wealthy industrialists.

Table XXIV summarizes the regional distribution of inbred private colleges. Only eight of the colleges were classified as faculty inbred, and seven were located in the Northeast and North Central core

TABLE XXIV

INBRED GEOGRAPHY PROGRAMS AT PRIVATELY SUPPORTED BACCALAUREATE COLLEGES

Region	Number of Inbred Programs	Number of Total Programs	Percent Inbred Programs
Northeast	3	18	16.67
South	1	8	12.50
North Central	4	21	19.05
West	0	0	0.00
Totals:	8	47	17.02

area. Seventeen percent of the private colleges were classified as having faculty inbred geography departments, with 50 percent of the inbred departments in the North Central Region and 38 percent in the Northeast.

The inbred faculty percentage (see Table XXV) was lower than the institutional percentage due to the large number of noninbred geographers employed by many private colleges. Less than 10 percent of the geographers in the Northeast were inbred. The South had 10 percent and the North Central 12 percent. Thus, less than 11 percent of the geographers in the most densely concentrated area for inbred geography departments were products of their own undergraduate schools. The 11 percent national average for inbred geographers in private baccalaureate colleges was the second lowest of the five baccalaureate divisions used in this research.

The chi-square test could not be utilizaed to test the significance of the distribution due to few observations.

TABLE XXV

INBRED GEOGRAPHY STAFF IN PRIVATELY SUPPORTED BACCALAUREATE COLLEGES

Region	Number of Inbred Faculty	Number of Total Faculty	Percent Inbred Faculty
Northeast	4	41	9.76
South	1	10	10.00
North Central	5	42	11.91
West	0	0	0.00
Totals:	10	93	10.75

Seven municipally controlled colleges were represented in this study. Five were located in New York City and one each in the District of Columbia and St. Louis. One college in New York City and one in the District of Columbia were inbred. Two-thirds of the geographers in the inbred college in the District of Columbia and one-ninth of the geographers in the New York City college were classified as inbred.

Two of the three federally controlled military academies participated in this study. Both academies were classified as faculty inbred. One had a 60 percent inbred rate, and the other had a 20 percent inbred staff. The military academies had a 50 percent inbred staff. This was the highest percentage for the five divisions of baccalaureate institutions used in this study.

Initially, the data were tabulated for inbred and noninbred faculty within inbred geography departments to determine whether inbreeding differences were significant between subdivisions of baccalaureate departments. The baccalaureate controlling agencies were

state, church, private, municipal, and federal. To determine whether differences of inbreeding were significant between the controlling agencies of colleges and universities, the chi-square test was administered. The five percent level of significance was accepted. If the calculated chi-square value with one degree of freedom was greater than 3.84, then the difference of inbreeding between the two categories would be significant and the null hypothesis rejected.

The following hypotheses were presented for all of the following comparisons of inbreeding between controlling agencies.

H_o: There is no difference between the proportion of inbred geographers employed in baccalaureate degree granting geography departments.

H_1: There is a difference between the proportion of inbred geographers employed in baccalaureate degree granting geography departments.

Ten chi-square tests were run for each combination of inbred departments, and three calculations rejected the null hypothesis (see Table XXVI). There were significant differences of inbreeding between state and federal schools, between private and federal schools, and between private and church colleges.

Both federal participants were highly inbred in comparison to the state colleges and universities, where less than 16 percent of such institutions were inbred. While 50 percent of the federal faculties were inbred, only 25 percent of the geographers in inbred departments and seven percent in all state institutions were so classified. The same generalization can be made between the private and federal institutions of higher education. Only 17 percent of the private colleges were inbred and less than 11 percent of the faculty, compared to the 50 percent inbred rate in the two academies. The chi-square test also

TABLE XXVI

CHI-SQUARE TEST OF INBREEDING IN INBRED BACCALAUREATE GEOGRAPHY PROGRAMS IN STATE, CHURCH, PRIVATE, MUNICIPAL, AND FEDERAL INSTITUTIONS OF HIGHER EDUCATION: 1976-1977 ACADEMIC YEAR

Controlling Agency	Number of Faculty		X^2
	Inbred	Noninbred	
State	43	135	2.650
Private	10	62	
State	43	135	1.547
Church	18	35	
State	43	135	0.005
Municipal	5	14	
State	43	135	9.395*
Federal	20	20	
Private	10	62	5.969*
Church	18	35	
Private	10	62	0.904
Municipal	5	14	
Private	10	62	15.307*
Federal	20	20	
Church	18	35	0.107
Municipal	5	14	
Church	18	35	1.808
Federal	20	20	
Municipal	5	14	2.069
Federal	20	20	

* = Significant differences

suggested there was a significant difference of inbreeding between private and church colleges. More than one-third of the faculty teaching in church controlled colleges were inbred in contrast to less than 11 percent in the private schools. While 17 percent of the private baccalaureate programs were inbred, more than 34 percent of the church geography departments were classified as inbred.

None of the remaining seven calculated chi-square values were close to the five percent level of significance. The chi-square test could not be used to test inbreeding between the controlling agencies of the master's degree programs due to the lack of agencies other than the state. The chi-square test was used to test the significance of inbreeding between state doctoral universities and the private doctoral geography programs, and the null hypothesis could not be rejected (see Table XV, page 70).

Similar tests, using the same hypotheses above, were run to test the significance of inbreeding using the inbred population and the total faculty in each agency with the same degree program. Six of the comparisons rejected the null hypothesis (see Table XXVII). The highest calculated chi-square value was between state and federal baccalaureate faculties. The second highest was between state and church controlled colleges and universities. One of every four geography departments in church controlled colleges was inbred, whereas less than eight percent of the geography departments that were state supported were inbred. Another large calculated chi-square value was between private and federal geography departments. The federal departments had a 50 percent inbred rate while the private colleges were 11 percent inbred. Other significant differences were between state colleges and universities

TABLE XXVII

CHI-SQUARE TEST OF INBREEDING IN BACCALAUREATE GEOGRAPHY PROGRAMS IN STATE, CHURCH, PRIVATE, MUNICIPAL, AND FEDERAL INSTITUTIONS OF HIGHER EDUCATION: 1976-1977 ACADEMIC YEAR

Controlling Agency	Number of Faculty		X^2
	Inbred	Noninbred	
State	43	598	1.754
Private	10	79	
State	43	598	25.394*
Church	18	54	
State	43	598	7.111*
Municipal	5	15	
State	43	598	78.974*
Federal	20	20	
Private	10	79	4.334*
Church	18	54	
Private	10	79	1.576
Municipal	5	15	
Private	10	79	21.114*
Federal	20	20	
Church	18	54	0.085
Municipal	5	15	
Church	18	54	6.097*
Federal	20	20	
Municipal	5	15	2.477
Federal	20	20	

* = Significant differences

and those classified as municipal schools, between church and federal institutions, and between private and church controlled colleges.

In summary, state controlled colleges and universities were significantly less inbred than those colleges with church, municipal, and federal control. Private colleges were significantly less inbred than church colleges and federal institutions of higher education. Church colleges were less inbred than the federally controlled baccalaureate institutions of higher education.

Departmentally Inbred Departments

Introduction. A departmentally inbred geography department is defined as having three or more full time teaching geographers and 50 percent or more of the staff have earned their highest degree from the same graduate department. There were 26 such departments represented in this study: five in the Northeast, eight in the South, 10 in the North Central Region, and three in the West (see Table XXVIII).

Departmentally Inbred Doctoral Department. One state supported university offering the doctoral program was classified as departmentally inbred. Three of the university's geographers (half of the staff) were graduates of the University of California at Berkeley. The other staff members were doctoral graduates of widely dispersed departments representing the South, North Central, and West regions.

None of the nine participating geography departments in private universities offering the doctoral degree for geographic study were classified as departmentally inbred departments.

TABLE XXVIII

DISTRIBUTION OF DEPARTMENTALLY INBRED DEPARTMENTS AND THE DOMINATING GRADUATE DEPARTMENT

Region	State	School Control	Pgm of Inbred Dept	Total	Dept Inbred	Dominating Graduate Dept.
Northeast	Mass.	State	M.A.	5	4	Clark University
	Mass.	State	B.A.	6	5	Clark University
	Mass.	State	B.A.	4	2	Clark University
	Mass.	State	B.A.	4	2	University of Chicago
	N.Y.	State	M.A.	4	2	University of Kansas
	Penn.	State	B.A.	4	2	Univ. North Carolina
South	Texas	State	Ph.D.	6	3	Univ. Calif.-Berkeley
	N.C.	State	B.A.	4	2	Univ. North Carolina
	N.C.	Church	B.A.	3	3	Univ. North Carolina
	Va.	State	B.A.	4	2	Clark University
	La.	State	B.A.	6	3	Un. Missouri-Columbia
	La.	State	B.A.	4	3	Louisiana State Univ.
	La.	State	B.A.	4	2	Louisiana State Univ.
	Okla.	State	B.A.	3	2	Univ. of Oklahoma
	Okla.	State	B.A.	4	2	Univ. of Oklahoma
North Central	Ill.	State	M.A.	4	2	Northwestern Univ.
	Ill.	Church	B.A.	3	2	University of Chicago
	Iowa	State	B.A.	3	2	Louisiana State Univ.
	Ohio	State	B.A.	6	3	Ohio State University
	S.D.	Church	B.A.	3	2	Univ. of Minnesota
	Wisc.	Church	B.A.	3	2	Un. Nebraska-Lincoln
West	Utah	State	B.A.	4	2	Un. Nebraska-Lincoln
	Calif.	State	B.A.	4	2	Columbia University
	Calif.	State	B.A.	4	2	Un. Colorado-Boulder
	Calif.	State	B.A.	3	2	Univ. Calif.-Berkeley
	Wash.	State	B.A.	6	3	Univ. of Michigan
Totals:				108	63	

Departmentally Inbred Master's Departments. Three state supported master's degree granting institutions, two in the Northeast and one in the North Central Region, were classified as departmentally inbred departments. Two of the staffs had 50 percent or more of their highest earned degrees from nearby doctoral granting departments. The third

university represented a school without any graduates from a state or regional doctoral program.

Departmentally Inbred Baccalaureate Departments. There were 18 state supported departmentally inbred baccalaureate departments. This represented less than 10 percent of the total number of baccalaureate departments participating in this study. In addition, there were four church supported colleges that were classified as departmentally inbred departments for geographic study. Three were located in the North Central Region and one was in the South.

Clark University dominated the departmentally inbred schools in Massachusetts. The geography department in Pennsylvania classified as departmentally inbred had half of its staff from the University of North Carolina. New York had a department with strong ties with the University of Kansas.

In the South, the University of North Carolina had strong ties with two schools in North Carolina. Virginia had the only department that was dominated by a Northeast graduate school. One department in Louisiana had half of its staff from the only master's program represented in Table XXVIII, the University of Missouri at Columbia. The other Louisiana departmentally inbred departments had strong ties with Louisiana State University at Baton Rouge. Two schools in Oklahoma were strongly oriented towards the University of Oklahoma.

Ohio and Illinois also illustrated strong ties between a bachelor's degree bestowing department and the doctoral program within the same state. A department in Iowa had more than half of its staff from Louisiana State University at Baton Rouge. Two other departments

in the North Central Region had ties with the University of Nebraska at Lincoln.

In the West, only one of three California departmentally inbred departments was dominated by one of the four geography doctoral programs in California. The others were dominated by Columbia University or the University of Colorado at Boulder. The departmentally inbred department in Washington was dominated by the University of Michigan. The pattern for the western universities was atypical since, nationally, most inbred departments reflect the majority of their staffs from state or regional geography graduate schools.

All of the departmentally inbred geographers in church controlled baccalaureate colleges had received their highest earned degrees from graduate departments within the same region. Two departmentally inbred departments had received their highest degrees from doctoral departments within the same state.

Three of the four departmentally inbred geography departments with church governing boards also illustrated "double accounting" characteristics because the departments were also classified as faculty inbred departments. They were located in the North Central Region. The southern geography department did not follow the above trend.

Conclusion. All sections but the West had most of their departmentally inbred departments dominated by graduate departments within the section. In the Northeast, as an example, three of six departments were dominated by a university in the Northeast. In the South, six universities were dominated by graduate departments in the South, while three others were dominated by departments from the

outside. Five of the six departmentally inbred departments in the North Central Region were dominated by regional universities, while the other was dominated by a university located in the South. In the West, two departments were dominated by western universities, two by universities in the North Central Region, and one by a university in the Northeast. Thus, the West illustrated an atypical pattern for departmentally inbred geography departments.

Publications as a Measure of Productivity

Introduction. An often leveled criticism of inbred faculty is that such personnel are less productive than noninbred faculty. Is such a generalization valid with reference to inbred geographers in the United States? A segment of the questionnaire dealt with this idea. The data were subdivided according to the control of the institution of higher education and the degree program of the geography department. It was assumed the publication activities by staff members in the doctoral departments would be greater than that of the master's and baccalaureate colleges and universities.

Doctoral Programs. Less than two percent of the geographers employed in state supported universities bestowing the doctoral degree lacked a publication (see Table XXIX). Slightly more than 62 percent of the 403 geographers that responded to the publication portion of the questionnaire had published more than 10 times, and almost one-third had published "more than 25 times." The latter group led in all regions of the country. A comparison of the number of publications with the professorial rank of the geographer illustrated a strong

TABLE XXIX

NUMBER OF GEOGRAPHERS IN PUBLICATION CATEGORIES EMPLOYED BY STATE SUPPORTED DOCTORAL DEGREE GRANTING UNIVERSITIES

Publication Categories	Number of Geographers in Each Category: Region				Total	Percent
	Northeast	South	North Central	West		
0	0	4	2	1	7	1.74
1-5	3	19	18	27	67	16.62
6-10	5	27	22	23	77	19.11
11-15	8	14	18	11	51	12.65
16-20	6	9	21	12	48	11.91
21-25	1	7	11	5	24	5.96
> 25	9	34	48	38	129	32.01
Totals:	32	114	140	117	403	100.00

correlation between the professor rank and the number of publications; 108 of the 129 geographers classified as prolific publishers (more than 25 publications) were full professors.

A comparison of the inbred faculty and the total faculty publication distribution illustrates the "greater than 25 publications" category led with the largest percentage of respondents (see tables XXIX and XXX). In Table XXIX, the "greater than 25 publications" category had almost twice as many respondents as the second leading category, whereas in Table XXX, there was slightly more than a four percent difference between the same two categories.

The publication data were originally divided into seven categories (see Table XXIX), but were collapsed into two groups: high and low. All geographers that had published more than 10 times were in the high group, and those that had published 10 times or less were placed in the low group. The chi-square test was used to determine whether the

TABLE XXX

NUMBER OF INBRED GEOGRAPHERS IN PUBLICATION CATEGORIES EMPLOYED BY STATE SUPPORTED DOCTORAL DEGREE GRANTING UNIVERSITIES

Publication Categories	Number of Geographers in Each Category: Region				Total	Percent
	Northeast	South	North Central	West		
0	0	1	0	1	2	2.99
1-5	0	5	4	4	13	19.40
6-10	0	6	4	7	17	25.37
11-15	0	3	0	4	7	10.45
16-20	0	2	1	1	4	5.97
21-25	0	0	2	2	4	5.97
> 25	0	5	8	7	20	29.85
Totals:	0	22	19	26	67	100.00

differences between inbred and noninbred geographers' publication activities were significant. The following hypotheses were presented:

H_o: There is no difference between the inbred and noninbred geographers in publication activity.

H_1: There is a difference between the inbred and noninbred geographers in publication activity.

The above hypotheses are applicable to the other chi-square tests in this section. The five percent level of significance was selected. If the calculated chi-square value was less than the critical value of 3.84 with one degree of freedom, the null hypothesis cannot be rejected.

The test between inbred and noninbred geographers employed by state supported doctoral institutions suggests the null hypothesis could not be rejected, illustrating there was no significant difference between the inbred and noninbred populations (see Table XXXI).

TABLE XXXI

CHI-SQUARE TEST BETWEEN INBRED AND NONINBRED GEOGRAPHERS IN STATE SUPPORTED DOCTORAL PROGRAMS AND THEIR PRODUCTIVITY

Inbred or Noninbred	Number of Faculty		X^2
	High	Low	
Noninbred Faculty	217	119	3.125
Inbred Faculty	35	32	

The chi-square test was administered to compare the publication activities between the national and regional doctoral staff. The null hypothesis could not be rejected because the publication distribution was almost identical (see Table XXXII).

TABLE XXXII

CHI-SQUARE TEST BETWEEN NATIONAL AND REGIONAL DEPARTMENT GEOGRAPHERS AND THEIR PRODUCTIVITY

University Classification	Number of Faculty		X^2
	High	Low	
National	93	44	0.017
Regional	95	42	

The inbred staff in the regional and national universities were also tested to determine if there were any significant differences in their publication activities. Again, the null hypothesis could not be rejected (see Table XXXIII).

TABLE XXXIII

CHI-SQUARE TEST BETWEEN INBRED GEOGRAPHERS IN NATIONAL AND REGIONAL DEPARTMENTS AND THEIR PRODUCTIVITY

University Classification	Number of Faculty		X^2
	High	Low	
National	22	11	0.110
Regional	15	5	

The chi-square test was administered to test the significance of the regional distribution of publication activities by geographers employed in state supported doctoral programs. The following hypotheses were presented:

H_o: There is no regional difference in the publication activity by geographers employed by state doctoral departments.

H_1: There is a regional difference in the publication activity by geographers employed by state doctoral departments.

A chi-square value of 7.82 at the five percent level of significance with three degrees of freedom would be significant. The calculated chi-square was 5.86; thus, the null hypothesis could not be rejected (see Table XXXIV).

TABLE XXXIV

CHI-SQUARE TEST OF THE REGIONAL DISTRIBUTION OF PUBLICATION ACTIVITIES BY GEOGRAPHERS IN STATE DOCTORAL PROGRAMS

	Region				Total
	Northeast	South	North Central	West	
High Productivity Faculty	24	64	98	66	252
OB Low Productivity Faculty	8	50	42	51	151
EX Low Productivity Faculty	12.0	42.7	52.5	43.8	151

$X^2 = 5.86$

There was a strong difference between the observed and expected data for the North Central Region. Seventy percent of the faculty in the region had more than 10 publications while the remainder of the faculty had slightly less than 59 percent in the same category.

All geographers employed in private departments offering the doctoral degree that returned the questionnaires had published at least once (see Table XXXV). Fifty percent had more than 15 publications. Slightly more than one-fourth of the participating inbred geographers were classified as prolific writers because each had "more than 25 publications." The private universities in the Northeast dominated the data because more than 72 percent of the geographers employed in private doctoral institutions were in that region. Twenty-one of the 39 northeastern geographers (54 percent) had published more than 15 times. Eleven of the 14 prolific publishers were from the Northeast. The 15 geographers outside the Northeast were about evenly distributed between the metropolitan areas of Chicago and Denver, and their respective

TABLE XXXV

NUMBER OF GEOGRAPHERS IN PUBLICATION CATEGORIES EMPLOYED BY PRIVATE DOCTORAL DEGREE GRANTING UNIVERSITIES

Publication Categories	Number of Geographers in Each Category: Region				Total	Percent
	Northeast	South	North Central	West		
0	0	0	0	0	0	0.00
1-5	7	0	1	2	10	18.52
6-10	5	0	1	1	7	12.96
11-15	6	0	3	1	10	18.52
16-20	8	0	1	1	10	18.52
21-25	2	0	1	0	3	5.56
> 25	11	0	1	2	14	25.92
Totals:	39	0	8	7	54	100.00

number of publications were about evenly dispersed through the six publication categories.

Only seven of 12 inbred geographers completed the publication part of the questionnaire: four in the Northeast, two in the West, and one in the North Central. The pattern was generally the same as that presented in Table XXXV for faculty in private doctoral geography departments. Four of the seven inbred geographers had published more than 15 times (two in the "greater than 25" and two in the "16 to 20" group). The remainder were in the "one to five" category. Due to the lack of a minimum number of publishing inbred geographers (20), the chi-square test was not administered.

The chi-square test was administered to compare the productivity of geographers in northeastern private universities with the national private population. The null hypothesis could not be rejected because the calculated chi-square value was 0.021 (see Table XXXVI).

TABLE XXXVI

CHI-SQUARE TEST OF PRODUCTIVITY IN PRIVATE DOCTORAL PROGRAMS AND THE NORTHEAST

Region	Number of Faculty		X^2
	High	Low	
Northeast Doctoral Fac.	27	12	0.021
Other Doctoral Faculty			

The chi-square test was administered to test the significance between the publication activities of the total state and private doctoral faculties (see Table XXXVII). The null hypothesis could not be rejected because the calculated chi-square value was 0.499. A similar test was made between the noninbred doctoral staff and the inbred geographers. Again, the null hypothesis could not be rejected.

TABLE XXXVII

CHI-SQUARE TEST OF PRODUCTIVITY IN DOCTORAL PROGRAMS

Degree Program	Number of Faculty		X^2
	High	Low	
State Doctoral Fac.	252	151	0.499
Private Doctoral Fac.	37	17	
All Noninbred Doct. Fac.	253	136	3.216
All Inbred Doctoral Fac.	40	35	

There were not enough data to test the municipal university doctoral publication activities. However, six of the seven geographers had published at least once. All of the categories except the "21 to 25" category were represented, and two geographers had "more than 25" publications. The inbred geographer was in the latter group.

Master's Programs. Most of the geographers employed in state supported colleges and universities bestowing the master's degree had published at least once. Only 37 of the 558 geographers (less than seven percent) lacked a publication (see Table XXXVIII). Slightly more than 60 percent of the surveyed geographers had published 10 times or less. More than 12 percent (71) had published more than 20 times. A little more than eight percent (46) could be considered prolific publishers because they had "more than 25" publications.

TABLE XXXVIII

NUMBER OF GEOGRAPHERS IN PUBLICATION CATEGORIES EMPLOYED BY STATE SUPPORTED MASTER'S DEGREE BESTOWING UNIVERSITIES

Publication Categories	Number of Geographers in Each Category: Region				Total	Percent
	Northeast	South	North Central	West		
0	8	12	13	4	37	6.63
1-5	24	81	106	31	242	43.37
6-10	16	21	42	26	105	18.82
11-15	7	11	41	9	68	12.19
16-20	0	9	19	7	35	6.27
21-25	3	9	5	8	25	4.48
> 25	7	11	16	12	46	8.24
Totals:	65	154	242	97	558	100.00

When comparing the publication tables for inbred geographers with the table for the total number of employed geographers in master's degree departments, one immediately notes the percentages for the "one to five" categories were almost identical (see tables XXXVIII and XXXIX). The other divisions, however, were quite different. Almost 10 percent of the inbred geographers lacked a publication. More than two-thirds of the inbred geographers had from one to 10 publications as compared to the national average of 62 percent. Two inbred geographers were classified as prolific publishers, and both were located in the North Central Region.

TABLE XXXIX

NUMBER OF INBRED GEOGRAPHERS IN PUBLICATION CATEGORIES EMPLOYED BY STATE SUPPORTED MASTER'S DEGREE GRANTING UNIVERSITIES

Publication Categories	Number of Geographers in Each Category: Region				Total	Percent
	Northeast	South	North Central	West		
0	0	2	3	0	5	9.43
1-5	3	6	11	3	23	43.40
6-10	1	4	5	3	13	24.53
11-15	2	0	3	0	5	9.43
16-20	0	1	1	1	3	5.67
21-25	0	1	1	0	2	3.77
> 25	0	0	2	0	2	3.77
Totals:	6	14	26	7	53	100.00

The chi-square test was administered to test if the proportion of inbred and noninbred geographers in the high publication category was significant. The results suggest there was no difference between the publication activities of inbred and noninbred geographers employed in state supported master's degree bestowing departments (see Table XL).

TABLE XL

CHI-SQUARE TEST OF PRODUCTIVITY IN MASTER'S DEGREE PROGRAMS

Region or Degree Pgm	Number of Faculty		X^2
	High	Low	
Noninbred State M.A. Fac.	162	343	1.575
Inbred State M.A. Faculty	12	41	
State M.A. Faculty	167	365	0.069
North Central Region	7	19	
All Noninbred M.A. Faculty	164	343	1.948
All Inbred M.A. Faculty	13	45	

The only regional comparison that could be examined was between the state supported master's degree departments and the North Central Region. The chi-square test suggested the null hypothesis could not be rejected because the calculated value was 0.069 (see Table XL).

Only one university supported by a church group offered the master's degree for geographic study. The data were incorporated with the state data. The chi-square test was then administered to determine whether the difference between inbred and noninbred publishing

activities was significant (see Table XL). The null hypothesis could not be rejected because the calculated chi-square value was 1.948, well below the 3.84 value for the five percent level of significance with one degree of freedom.

Bachelor's Programs. Table XLI summarizes the data for state controlled baccalaureate institutions, by regions. About 48 percent of the geographers had "one to five" publications. Slightly less than 75 percent had published from one to 15 times. More than six percent had published more than 25 articles, manuscripts, or books. Over half of the latter group were employed in southern colleges and universities. At the other end of the spectrum were slightly less than 15 percent of the geographers that lacked a publication. The South also led in the latter category. The "one to five" category had the largest number of geographers in each region. Table XLI also hints that state supported baccalaureate colleges and universities were not too involved with research activities, as evidenced when more than 60 percent of the geographers had published five times or less. It should also be noted there were no criteria in this study which evaluated the quality of the publications.

The pattern was basically the same between inbred faculty and the total number of geographers in baccalaureate schools. The percentage was more than twice as high for the nonpublishers category in the inbred data (see Table XLII), and the "one to five" division was slightly smaller for the inbred geographers. Combining the first two categories in Table XLII would include more than 72 percent of the inbred faculty as compared to the 62 percent for the total faculty in baccalaureate

TABLE XLI

NUMBER OF GEOGRAPHERS IN PUBLICATION CATEGORIES EMPLOYED BY STATE SUPPORTED BACCALAUREATE COLLEGES AND UNIVERSITIES

Publication Categories	Number of Geographers in Each Category: Region				Total	Percent
	Northeast	South	North Central	West		
0	20	43	25	4	92	14.42
1-5	74	88	95	47	304	47.65
6-10	34	47	21	20	122	19.12
11-15	19	15	10	7	51	7.99
16-20	6	6	3	3	18	2.82
21-25	4	1	3	2	10	1.57
> 25	10	21	6	4	41	6.43
Totals:	167	221	163	87	638	100.00

TABLE XLII

NUMBER OF INBRED GEOGRAPHERS IN PUBLICATION CATEGORIES EMPLOYED BY STATE SUPPORTED BACCALAUREATE DEGREE GRANTING UNIVERSITIES

Publication Categories	Number of Geographers in Each Category: Region				Total	Percent
	Northeast	South	North Central	West		
0	4	5	4	0	13	30.23
1-5	6	6	4	2	18	41.86
6-10	1	3	1	2	7	16.27
11-15	1	1	0	0	2	4.65
16-20	1	0	0	0	1	2.33
21-25	1	0	0	0	1	2.33
> 25	1	0	0	0	1	2.33
Totals:	15	15	9	4	43	100.00

bestowing institutions. The Northeast and South led with 11 and 10 respectively in the number of inbred geographers that had publications.

Geographers employed by church supported baccalaureate colleges and universities have contributed considerably to the geographic literature. Table XLIII summarizes the publication data, by regions. Fifty-three of the 70 geographers had published one or more manuscripts. About 55 percent of the writers were in the North Central Region. The North Central and South were first and second, respectively, in the number of geographers that had published. Both regions had a single representative in the "greater than 25" category, and both regions had three geographers in the more than 15 publication grouping. The same regions also led in the number of nonpublishers. All of the geographers in the Northeast and West had published.

TABLE XLIII

NUMBER OF GEOGRAPHERS IN PUBLICATION CATEGORIES EMPLOYED BY CHURCH SUPPORTED BACCALAUREATE COLLEGES AND UNIVERSITIES

Publication Categories	Number of Geographers in Each Category: Region				Total	Percent
	Northeast	South	North Central	West		
0	0	6	11	0	17	24.28
1-5	4	11	18	1	34	48.57
6-10	2	3	6	0	11	15.71
11-15	0	0	2	0	2	2.86
16-20	0	2	0	0	2	2.86
21-25	0	0	2	0	2	2.86
> 25	0	1	1	0	2	2.86
Totals:	6	23	40	1	70	100.00

Table XLIV presents a summary of publications by inbred faculty employed in church supported colleges and universities. The three categories above 15 publications lacked representation in any region. Four of the inbred faculty lacked a publication. Over half had published from "one to five" times, and this was a slightly higher percentage than the same category in Table XLIII.

TABLE XLIV

NUMBER OF INBRED GEOGRAPHERS IN PUBLICATION CATEGORIES EMPLOYED BY CHURCH SUPPORTED BACCALAUREATE COLLEGES AND UNIVERSITIES

Publication Categories	Number of Geographers in Each Category: Region				Total	Percent
	Northeast	South	North Central	West		
0	0	1	3	0	4	22.22
1-5	1	3	6	0	10	55.56
6-10	0	0	2	0	2	11.11
11-15	0	0	2	0	2	11.11
Totals:	1	4	13	0	18	100.00

More than 90 percent of all geographers employed in private geography baccalaureate departments had published one or more times, and half were in the "one to five" category (see Table XLV). Approximately two-thirds had one to 10 publications. More than 47 percent of the publishing geographers for private baccalaureate institutions were in the North Central Region. The second most prolific region was the Northeast with 37 geographers (44 percent). The area from the plains to the Atlantic Ocean and north of the Ohio River was the location of

TABLE XLV

NUMBER OF GEOGRAPHERS IN PUBLICATION CATEGORIES EMPLOYED BY PRIVATELY SUPPORTED BACCALAUREATE COLLEGES

Publication Categories	Number of Geographers in Each Category: Region				Total	Percent
	Northeast	South	North Central	West		
0	3	0	4	0	7	8.23
1-5	16	4	23	0	43	50.59
6-10	6	4	6	0	16	18.82
11-15	4	0	2	0	6	7.06
16-20	4	0	1	0	5	5.88
21-25	2	0	2	0	4	4.71
>25	2	0	2	0	4	4.71
Totals:	37	8	40	0	85	100.00

70 of the 78 geographers in private baccalaureate colleges (90 percent) that had published at least once. All eight geographers in the South had published, but none more than 10 times. The Northeast was the only region that had an inbred geographer with more than 15 publications (see Table XLVI).

Only 15 geographers in baccalaureate municipal departments completed the publication section of the questionnaire. Eleven had 10 or less publications and four had more than 10. The four were located in the Northeast, as were seven of the 11. Only one inbred geographer had published, and he had more than 10 manuscripts.

Seventy percent of the teaching staff at the military academies published "one to five" times; seven geographers (17 percent) lacked a publication. Four of the 20 inbred geographers lacked a publication; thus, 75 percent of the inbred personnel published "one to five" times. The other inbred geographer had between "11 and 16" publications.

TABLE XLVI

NUMBER OF INBRED GEOGRAPHERS IN PUBLICATION CATEGORIES EMPLOYED BY PRIVATELY SUPPORTED BACCALAUREATE COLLEGES

Publication Categories	Number of Geographers in Each Category: Region				Total	Percent
	Northeast	South	North Central	West		
0	0	0	2	0	2	22.22
1-5	1	0	2	0	3	33.33
6-10	0	1	0	0	1	11.11
11-15	0	0	1	0	1	11.11
16-20	1	0	0	0	1	11.11
21-25	0	0	0	0	0	0.00
> 25	1	0	0	0	1	11.11
Totals:	3	1	5	0	9	99.99

Therefore, the inbred geographers at the federally controlled academies led the noninbred staff in two categories: no publications and "one to five" publications.

Conclusion. Table XLVII presents the chi-square test results for comparisons between high and low publication tabulations for baccalaureate programs. Only the comparison between state and federal schools was significant at the five percent level of confidence. The low publication rate at the federal academies was expected due to the different career goals of most of the faculty. The null hypothesis could not be rejected for the comparative tests between state and private, between state and church, and between church and private baccalaureate programs.

Table XLVIII presents the chi-square test for comparisons between state controlled baccalaureate programs and the four regions of the

TABLE XLVII

CHI-SQUARE TEST OF PRODUCTIVITY BETWEEN BACCALAUREATE PROGRAMS

Controlling Agency	Number of Faculty		X^2
	High	Low	
State Faculty	120	518	3.973
Federal Faculty	2	38	
State Faculty	120	518	0.400
Private Faculty	19	66	
State Faculty	120	518	1.848
Church Faculty	8	62	
Church Faculty	8	62	2.471
Private Faculty	19	66	

TABLE XLVIII

CHI-SQUARE TEST OF PRODUCTIVITY BETWEEN STATE BACCALAUREATE PROGRAMS AND REGIONS OF THE UNITED STATES

	Region				Total
	Northeast	South	North Central	West	
High Productivity Faculty	39	43	22	16	120
OB Low Productivity Faculty	128	178	141	71	518
EX Low Productivity Faculty	135.6	179.5	132.3	70.6	518

$X^2 = 1.02$

country. The null hypothesis must be accepted. Thus, there was no significant regional variation in the publication activities for state baccalaureate faculty.

Another chi-square test compared the combined faculty for the five controlling agencies with the combined inbred staff for the five baccalaureate subdivisions (see Table XLIX). The results were the same; there was no significant difference between inbred and noninbred geographers and their publication activities.

TABLE XLIX

CHI-SQUARE TEST OF COMBINED NONINBRED AND INBRED BACCALAUREATE FACULTY

	Number of Faculty		x^2
	High	Low	
All Noninbred Bacc. Fac.	141	614	1.496
All Inbred Bacc. Faculty	12	81	

Finally, the combined baccalaureate faculty productivity was tested for regional variation (see Table L). The null hypothesis could not be rejected. There were slight variations between the observed and expected data for the Northeast and North Central regions.

In summary, the frequency of publication by geographers employed in doctoral programs was significantly higher than that of faculty in master's and baccalaureate departments. Master's faculty, in turn, were significantly more productive than the baccalaureate departments. The North Central Region had a significantly higher publication activity in doctoral programs when compared with other regions of the United States, and the strength of the state controlled doctoral

TABLE L

CHI-SQUARE TEST OF PRODUCTIVITY BETWEEN TOTAL BACCALAUREATE STAFF AND REGIONS OF THE COUNTRY

	Region				Total
	Northeast	South	North Central	West	
High Productivity Faculty	56	46	34	17	153
OB Low Productivity Faculty	195	209	210	81	695
EX Low Productivity Faculty	205.7	209.0	200.0	80.3	695

$X^2 = 1.07$

departments' publishing activities also suggested the North Central Region was significantly greater than the other regions. Similar patterns were found in the baccalaureate comparisons. The North Central and Northeast regions tend to be more productive through publication activities than the South and West.

Acceptable Percentage for Inbred Faculty

Introduction. How do the inbred geographers compare with the noninbred geographers when considering what percentage of the faculty could be inbred? This is a tough question when one considers the phrase "percentage acceptable," because one inbred geographer on a staff of two means 50 percent is acceptable. Several geographers emphasized this factor on their returned questionnaires. Geographers also pointed out their response would vary according to the type of program (bachelor's, master's, or doctor's) offered by the college or university. Others suggested the acceptable percentage would be higher for the University of California at Berkeley or the University of

Minnesota than it would be for lesser known doctoral institutions of higher education.

The data were collapsed from six categories presented in the regional tables to two groups: high acceptable percentage and low acceptable percentage. The former included all geographers that believed the acceptable percentage should be greater than 20 percent, while the latter was for an acceptable percentage equal to or less than 20 percent. Two-by-two tables were utilized for testing purposes. The five percent level of significance was accepted. A calculated chi-square value of 3.84 with one degree of freedom would be needed to reject the null hypothesis.

The chi-square test was used to determine if there was a significant difference between inbred and noninbred geographers' acceptable percentage for inbred faculty. The following hypotheses were proposed:

H_o: There is no difference between inbred and noninbred geographers in their acceptable percentage for inbreeding.

H_1: There is a difference between inbred and noninbred geographers in their acceptable percentage for inbreeding.

Table LI presents a tabulation of inbred and noninbred geographers and their acceptable percentage for inbred staff. The bachelor's, master's, and doctor's programs were tested separately, and all the controlling agencies were included, where applicable.

The null hypothesis was rejected in all chi-square tests presented in Table LI. There was a significant difference between inbred and noninbred geographers at the baccalaureate, master's, and doctor's level and their acceptable percentage for inbred personnel. In all

TABLE LI

CHI-SQUARE TEST BETWEEN INBRED AND NONINBRED GEOGRAPHERS OF THE ACCEPTABLE PERCENTAGE FOR INBRED PERSONNEL

Controlling Agency	Number of Faculty		X^2
	High	Low	
All Noninbred Bacc. Fac.	188	541	38.572*
All Inbred Bacc. Faculty	50	35	
All Noninbred M.A. Fac.	99	388	18.887*
All Inbred M.A. Faculty	25	27	
All Noninbred Ph.D. Fac.	57	313	21.064*
All Inbred Ph.D. Faculty	27	40	

* = Significant differences

cases a large percentage of the noninbred geographers believed the acceptable percentage for inbred staff should be less than 20 percent, as compared to the percentage by inbred geographers. The major differences in the three calculated chi-square values were the percentages of inbred geographers in the low category.

The null hypothesis could not be rejected when a comparison was made between the national and regional university faculties and their acceptable percentage for inbred faculty (see Table LII). The inbred geographers in the regional and national universities were also tested to determine whether there were any significant difference in their acceptable percentage for inbred geographers. Again, the null hypothesis could not be rejected (see Table LIII).

TABLE LII

CHI-SQUARE TEST BETWEEN NATIONAL AND REGIONAL DEPARTMENT GEOGRAPHERS AND THEIR ACCEPTABLE PERCENTAGE FOR INBREEDING

University Classification	Number of Faculty		X^2
	High	Low	
National	21	102	1.914
Regional	32	96	

TABLE LIII

CHI-SQUARE TEST BETWEEN INBRED GEOGRAPHERS IN NATIONAL AND REGIONAL DOCTORAL DEPARTMENTS AND THEIR ACCEPTABLE PERCENTAGE FOR INBREEDING

University Classification	Number of Faculty		X^2
	High	Low	
National	18	13	0.024
Regional	12	8	

Doctoral Programs. More than 94 percent of the geographers employed by state supported doctoral universities in the United States responded on their data sheets that less than one-third of their staffs could be inbred (see Table LIV).

Eighty-one percent of the staff employed by state supported doctoral departments believed 20 percent or less of the staff could be inbred. Slightly less than six percent suggested more than 30 percent could be inbred, with only one geographer in the Northeast in agreement

TABLE LIV

REGIONAL DISTRIBUTION OF THE ACCEPTABLE PERCENTAGE FOR INBRED FACULTY BY STATE SUPPORTED DOCTORAL GEOGRAPHY STAFFS

Acceptable Percent	Region				Total	Percent
	Northeast	South	North Central	West		
≤10	19	52	58	21	150	39.58
11-20	8	37	59	53	157	41.42
21-30	4	13	11	23	51	13.46
31-40	0	4	5	2	11	2.90
41-50	1	1	0	0	2	0.53
> 50	0	3	1	4	8	2.11
Totals:	32	110	134	103	379	100.00

with the latter figure. Less than 60 percent of the inbred geographers replied on their data sheets the acceptable percentage for inbred faculty should be 20 percent or less. Only three inbred geographers believed more than 40 percent would be an acceptable percentage, and all three believed the percentage should be "greater than 50 percent" (see Table LV).

To determine whether the data for regional variations for an acceptable percentage were significant, the chi-square test was administered. The following hypotheses were proposed:

H_o: There is no difference between the regions in the acceptable percentage for inbreeding.

H_1: There is a difference between the regions in the acceptable percentage for inbreeding.

The above hypotheses will be used for the chi-square tests administered in this section of the chapter. The five percent level of significance was accepted. For state supported doctoral programs, there was no significant difference between regions (see Table LVI).

TABLE LV

REGIONAL DISTRIBUTION OF INBRED GEOGRAPHERS' ACCEPTABLE PERCENTAGE FOR INBRED FACULTY BY STATE SUPPORTED DOCTORAL GEOGRAPHY DEPARTMENTS

Acceptable Percent	Region				Total	Percent
	Northeast	South	North Central	West		
≤10	0	5	6	1	12	19.67
11-20	0	8	7	9	24	39.34
21-30	0	5	4	11	20	32.79
31-40	0	1	1	0	2	3.28
41-50	0	0	0	0	0	0.00
>50	0	1	1	1	3	4.92
Totals:	0	20	19	22	61	100.00

TABLE LVI

CHI-SQUARE TEST OF THE REGIONAL DISTRIBUTION OF GEOGRAPHERS EMPLOYED BY STATE SUPPORTED DOCTORAL PROGRAMS AND THEIR ACCEPTABLE PERCENTAGE FOR INBREEDING

	Region				Total
	Northeast	South	North Central	West	
Total State Doctoral Faculty	32	110	134	103	379
OB Doctoral Faculty >20%	5	21	17	29	72
EX Doctoral Faculty >20%	6.1	20.9	25.4	19.6	72

$X^2 = 7.49$

The 7.49 calculated chi-square value was almost at the five percent level of significance. This was due to the West and its high inbred faculty and their high acceptable percentage for inbreeding, and the North Central Region where fewer geographers than expected selected the greater than 20 percent level for inbred faculty.

Almost 77 percent of the geographers employed in private university geography departments bestowing the doctoral degree responded that the acceptable percentage for inbred faculty should be 20 percent or less (see Table LVII). Only four geographers believed the acceptable percentage should be more than 30 percent.

TABLE LVII

REGIONAL DISTRIBUTION FOR AN ACCEPTABLE PERCENTAGE FOR INBRED FACULTY BY PRIVATELY SUPPORTED DOCTORAL GEOGRAPHY DEPARTMENTS

Acceptable Percent	Region				Total	Percent
	Northeast	South	North Central	West		
≤10	15	0	2	3	20	38.46
11-20	16	0	2	2	20	38.46
21-30	4	0	2	2	8	15.39
31-40	2	0	0	0	2	3.85
41-50	0	0	1	0	1	1.92
>50	0	0	1	0	1	1.92
Totals:	37	0	8	7	52	100.00

Four of the seven inbred geographers selected the "11 to 20 percent" acceptable category. More than half of the inbred geographers agreed with the noninbred faculty the percentage of inbred faculty should be 20 percent or less of the full-time teaching staff. The chi-square test was not administered due to the small number of inbred geographers participating in this research.

Six geographers employed in the municipally controlled doctoral department believed the acceptable percentage for inbreeding should

be 20 percent or less. The inbred geographer did not select a preference.

All of the doctoral program teaching staff were grouped together in order to test the regional variation for an acceptable percentage for inbreeding. Again, no significant regional variation appeared (see Table LVIII).

TABLE LVIII

CHI-SQUARE TEST OF THE REGIONAL DISTRIBUTION OF EMPLOYED GEOGRAPHERS IN ALL DOCTORAL PROGRAMS AND THEIR ACCEPTABLE PERCENTAGE FOR INBREEDING

	Region				Total
	Northeast	South	North Central	West	
Total Doctoral Faculty	69	110	148	110	437
OB Doctoral Faculty >20%	11	21	21	31	84
EX Doctoral Faculty >20%	13.3	21.1	28.5	21.1	84

$X^2 = 2.38$

The general conclusion is there was no basic difference between inbred and noninbred geographers and what they considered to be an acceptable percentage for inbreeding. The same conclusion applies to the regional variation. Proportionally, most geographers believe the inbreeding percentage should be kept to a minimum.

Master's Programs. More than 90 percent of the geographers at state supported colleges and universities bestowing the master's degree

responded on their returned questionnaires that no more than one-third of a geography staff should be inbred (see Table LIX). More than 77 percent stated the acceptable percentage should be 20 percent or less. At the other end of the spectrum, less than three percent believed the allowable inbreeding percentage should be unlimited. Three of the 13 geographers in the latter category were inbred.

TABLE LIX

REGIONAL DISTRIBUTION FOR AN ACCEPTABLE PERCENTAGE FOR INBRED FACULTY AT STATE SUPPORTED GEOGRAPHY DEPARTMENTS BESTOWING THE MASTER'S DEGREE

Acceptable Percent	Region				Total	Percent
	Northeast	South	North Central	West		
≤10	28	65	89	30	212	39.48
11-20	23	56	87	37	203	37.80
21-30	9	16	31	15	71	13.22
31-40	1	4	9	4	18	3.35
41-50	3	7	5	5	20	3.73
>50	0	0	11	2	13	2.42
Totals:	64	148	232	93	537	100.00

Table LX represents the tabulations by inbred geographers. More than one-third of the inbred geographers believed between "11 and 20 percent" would be an acceptable percentage for an inbred staff. More than 53 percent suggested equal to or less than 20 percent would be acceptable.

Table LXI presents the chi-square test results for regional comparisons for the acceptable percentage for inbreeding by state

TABLE LX

ACCEPTABLE PERCENTAGE FOR INBRED FACULTY BY INBRED GEOGRAPHERS IN STATE SUPPORTED MASTER'S DEGREE GEOGRAPHY DEPARTMENTS

Acceptable Percent	Region				Total	Percent
	Northeast	South	North Central	West		
≤10	2	0	6	1	9	18.37
11-20	3	4	8	2	17	34.69
21-30	0	4	4	3	11	22.45
31-40	0	1	1	0	2	4.08
41-50	1	4	2	0	7	14.29
>50	0	0	3	0	3	6.12
Totals:	6	13	24	6	49	100.00

TABLE LXI

CHI-SQUARE TEST OF THE REGIONAL DISTRIBUTION OF GEOGRAPHERS EMPLOYED IN STATE SUPPORTED MASTER'S PROGRAMS AND THEIR ACCEPTABLE PERCENTAGE FOR INBREEDING

	Region				Total
	Northeast	South	North Central	West	
Total State M.A. Faculty	64	148	232	93	537
OB State M.A. Faculty >20%	13	27	56	26	122
EX State M.A. Faculty >20%	14.5	33.7	52.7	21.1	122

$X^2 = 2.84$

supported master's degree program faculty. The null hypothesis could not be rejected. The acceptable percentage for inbreeding did not vary significantly by region.

The chi-square test found no significant differences when comparing the attitudes toward acceptable inbreeding levels for

different types of degree programs (see Table LXII). None of the test results were close to the five percent level of significance.

TABLE LXII

CHI-SQUARE TEST OF INBRED GEOGRAPHERS EMPLOYED IN STATE COLLEGES AND UNIVERSITIES AND THEIR ACCEPTABLE PERCENTAGE FOR INBREEDING

Controlling Agency or Region	Number of Faculty High	Low	X^2
Inbred State M.A. Faculty	23	26	0.187
Inbred State Doctoral Fac.	25	36	
Inbred State M.A. Faculty	23	26	0.000
Inbred State Bacc. Faculty	17	21	
Inbred State Bacc. Faculty	17	21	0.025
Inbred State Doctoral Fac.	25	36	

The same comparisons were made between all the employed geographers in state supported schools. The null hypothesis could only be rejected in the comparison between the doctoral and baccalaureate programs. A large proportion of the doctoral geographers stated the acceptable percentage should be low (see Table LXIII).

Baccalaureate Programs. Table LXIV summarizes the findings for geographers that completed the acceptable percentage portion of the questionnaire and were employed by state supported colleges or universities.

TABLE LXIII

CHI-SQUARE TEST OF STATE SUPPORTED PROGRAMS AND THEIR ACCEPTABLE PERCENTAGE FOR INBREEDING

Controlling Agency or Program	Number of Faculty High	Low	X^2
All State Bacc. Faculty	154	461	0.726
All State M.A. Faculty	122	415	
All State Bacc. Faculty	154	461	4.537*
All State Doctoral Faculty	72	307	
All State M.A. Faculty	122	415	1.627
All State Doctoral Faculty	72	307	

* = Significant differences

TABLE LXIV

REGIONAL DISTRIBUTION FOR AN ACCEPTABLE PERCENTAGE FOR INBRED FACULTY BY STATE SUPPORTED BACCALAUREATE GEOGRAPHY DEPARTMENTS

Acceptable Percent	Region				Total	Percent
	Northeast	South	North Central	West		
≤10	75	96	46	29	246	40.00
11-20	55	75	56	29	215	34.96
21-30	23	32	30	18	103	16.75
31-40	1	5	10	1	17	2.76
41-50	4	6	8	3	21	3.42
>50	1	3	6	3	13	2.11
Totals:	159	217	156	83	615	100.00

The largest number of geographers believed the percentage for inbred faculty should be "10 percent or less." Almost 75 percent of

the geographers teaching in state supported baccalaureate colleges and universities selected the first two categories. More than 91 percent thought less than one-third of the staff could be inbred. Thus, it is safe to conclude most geographers believed the percentage for inbred faculty should be kept to a minimum. Only two percent stated that inbreeding could be greater than 50 percent.

Table LXV presents the inbred faculty's viewpoint. A little over 55 percent of the inbred geographers stated the inbred faculty should be 20 percent or less. Only 38 of the 43 inbred geographers elected to complete this portion of the questionnaire. Several geographers wrote on the returned forms the size of the department was a determining factor. Others stated the percentage concept was detrimental and the qualifications of the geographer was the prime criteria to determine whether the geographer was to be hired, not where he or she received the geographical training.

TABLE LXV

ACCEPTABLE PERCENTAGE FOR INBRED FACULTY BY INBRED GEOGRAPHERS EMPLOYED BY STATE SUPPORTED BACCALAUREATE PROGRAMS

Acceptable Percent	Region				Total	Percent
	Northeast	South	North Central	West		
≤10	4	1	1	0	6	15.79
11-20	6	6	2	1	15	39.47
21-30	2	2	0	1	5	13.16
31-40	0	0	3	0	3	7.89
41-50	1	1	2	0	4	10.53
>50	0	3	0	2	5	13.16
Totals:	13	13	8	4	38	100.00

Geographers in the church supported colleges and universities were not in total agreement for an acceptable percentage for inbreeding. Table LXVI suggests that almost 70 percent believed that less than one-third of the teaching staff could be inbred. Three geographers selected the "greater than 50 percent" category; all were located in the North Central Region, all were inbred, and all were chairmen of their departments.

TABLE LXVI

CHURCH BACCALAUREATE COLLEGE AND UNIVERSITY GEOGRAPHERS' ACCEPTABLE PERCENTAGE FOR INBREEDING

Acceptable Percent	Region				Total	Percent
	Northeast	South	North Central	West		
≤10	2	6	4	0	12	19.05
11-20	1	7	9	1	18	28.57
21-30	2	3	9	0	14	22.22
31-40	0	1	6	0	7	11.11
41-50	1	4	4	0	9	14.29
>50	0	0	3	0	3	4.76
Totals:	6	21	35	1	63	100.00

Table LXVII presents the views of inbred geographers in church supported colleges and universities. More than 43 percent believed that over 40 percent would be acceptable. One could conclude that half of the inbred geographers believed the acceptable percentage could be greater than one-third of the teaching staff.

TABLE LXVII

ACCEPTABLE PERCENTAGE FOR INBRED FACULTY BY INBRED GEOGRAPHERS EMPLOYED BY CHURCH SUPPORTED BACCALAUREATE COLLEGES AND UNIVERSITIES

Acceptable Percent	Region				Total	Percent
	Northeast	South	North Central	West		
≤10	0	0	1	0	1	6.25
11-20	0	1	3	0	4	25.00
21-30	1	0	1	0	2	12.50
31-40	0	0	2	0	2	12.50
41-50	0	2	2	0	4	25.00
>50	0	0	3	0	3	18.75
Totals:	1	3	12	0	16	100.00

Almost 68 percent of the geographers in private baccalaureate colleges believed 20 percent of the teaching staff could be inbred (see Table LXIII). More than 90 percent of the geographers believed the acceptable inbreeding percentage should be less than one-third of the teaching faculty. Two geographers, one inbred, selected the "greater than 50 percent" category. Seven of the eight inbred geographers stated they believed the inbred faculty should be less than one-third of the teaching staff. The eighth member stated more than half of the staff could be inbred.

Fourteen geographers in municipally controlled departments expressed an acceptable percentage for inbreeding; half selected the "less than 10 percent" category, while two geographers believed between "41 to 50 percent" would be acceptable.

A clear distinction was not available for an acceptable percentage for inbreeding by the federal academies. Nine of the 10 geographers at

TABLE LXVIII

PRIVATE BACCALAUREATE COLLEGE GEOGRAPHERS' ACCEPTABLE PERCENTAGE FOR INBREEDING

Acceptable Percent	Region				Total	Percent
	Northeast	South	North Central	West		
≤10	8	5	10	0	23	28.39
11-20	13	4	15	0	32	39.51
21-30	6	1	12	0	19	23.46
31-40	2	0	0	0	2	2.47
41-50	2	0	1	0	3	3.70
>50	1	0	1	0	2	2.47
Totals:	32	10	39	0	81	100.00

one academy believed the acceptable percentage should be less than one-third. The second academy had a different distribution. Slightly less than two-thirds of the geographers believed inbreeding should be less than one-third of the staff. Eight of the 18 inbred geographers (44 percent) concurred.

There were large differences of opinion on an acceptable percentage for inbred faculty between the controlling agencies and baccalaureate colleges and universities (see Table LXIX). There were 10 possible combinations. Comparisons for geographers in municipal departments could not be tested due to the low frequencies. Four of the six chi-square tests suggested there were significant differences between the controlling agencies and their respective acceptable percentages for an inbred staff. The strongest difference was between the baccalaureate state schools and the church controlled geographic programs. Twenty-five percent of the faculty in state geography departments stated the percentage could be greater than 20 percent,

TABLE LXIX

CHI-SQUARE TEST OF ACCEPTABLE PERCENTAGES FOR INBREEDING BETWEEN GEOGRAPHERS EMPLOYED IN BACCALAUREATE COLLEGES AND UNIVERSITIES

Controlling Agency	Number of Faculty		X^2
	High	Low	
Total State Bacc. Faculty	154	461	20.039*
Total Church Bacc. Faculty	33	30	
Total State Bacc. Faculty	154	461	1.510
Total Private Bacc. Faculty	26	55	
Total State Bacc. Faculty	154	461	15.664*
Total Federal Bacc. Faculty	22	18	
Total Church Bacc. Faculty	33	30	5.218*
Total Private Bacc. Faculty	26	55	
Total Church Bacc. Faculty	33	30	0.003
Total Federal Bacc. Faculty	22	18	
Total Private Bacc. Faculty	26	55	4.950*
Total Federal Bacc. Faculty	22	18	

* = Significant differences

whereas more than 52 percent of the church faculty agreed. The null hypothesis was also rejected when the faculties of military academies were compared with the state faculties. The third rejection of the null hypothesis was a comparison between the church and private baccalaureate geographers. Finally, the comparison between the private and federal programs also rejected the null hypothesis. In the four rejections, a large proportion of the faculty in either the church or federally controlled institutions believed more than 30 percent would be an acceptable figure for inbreeding.

The null hypothesis could not be rejected when comparisons were made between state and private baccalaureate faculties and between church and federal geographers. In the former, both groups had a low acceptable percentage for inbreeding. The latter pair believed a high percentage would be acceptable.

All baccalaureate faculty were grouped together to test the regional variations for an acceptable inbreeding percentage (see Table LXX). The null hypothesis was rejected primarily because of the relatively high acceptable percentage among geographers in both state and church baccalaureate institutions in the North Central Region. Also, the South added to the rejection because fewer geographers than expected believed more than 20 percent would be an acceptable percentage for inbreeding

TABLE LXX

CHI-SQUARE TEST BETWEEN THE TOTAL BACCALAUREATE FACULTY AND REGIONS OF THE COUNTRY

	Region				Total
	Northeast	South	North Central	West	
Total Baccalaureate Faculty	237	251	231	94	813
OB Bacc. Faculty >20%	62	57	90	29	238
EX Bacc. Faculty >20%	69.4	73.5	67.6	27.5	238

$X^2 = 11.99$

The inbred geographers employed in baccalaureate departments were also tested to determine if there was any significant difference in their respective acceptable percentages for inbred faculty (see Table LXXI). Because of low frequencies, the chi-square test could not be administered between inbred state and private faculties. In all tested cases, the null hypothesis could not be rejected. Thus, there was little difference between the acceptable inbreeding percentages by inbred geographers for inbred faculty in state, church, and federal baccalaureate geography departments.

TABLE LXXI

CHI-SQUARE TEST OF INBRED GEOGRAPHERS EMPLOYED IN BACCALAUREATE DEPARTMENTS AND THEIR ACCEPTABLE PERCENTAGE FOR INBREEDING

Controlling Agency	Number of Faculty		X^2
	High	Low	
Inbred State Bacc. Faculty	17	21	1.728
Inbred Church Bacc. Faculty	11	5	
Inbred Church Bacc. Faculty	11	5	0.002
Inbred Federal Bacc. Fac.	15	5	
Inbred State Bacc. Faculty	17	21	3.706
Inbred Federal Bacc. Fac.	15	5	

Summary

Most previous studies on inbreeding used the total faculty of the college or university. There were no departmental categories. Therefore, most comparisons that can be made between this and other studies on inbreeding must be done with caution. Roberts found the inbred rate for all types of institutions of higher education was 33.9 percent in the early 1940's.[1] Hargens noted that 13 percent of the physical and biological departments and 18 percent of the humanities and social science departments were inbred.[2] Regardless of where geography is classified, physical or social, geography's 30 percent departmental inbreeding rate is higher than Hargens' findings.

Excluding controlling agencies with five or less departments that participated in this research, state supported doctoral departments had the highest percentage of inbred programs. Private doctoral departments were second, and the state supported master's degree programs third. Thus, the generalization in the first chapter was verified in this study: the higher the degree offered by a department, the higher the percentage of inbred departments.

In the baccalaureate category, state supported departments were least inbred, followed, in order, by private, municipal, and church supported colleges and universities. This generalization was also in

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[1]James B. Roberts, "Inbreeding Practiced in Appointing College and University Teachers and Administrators" (unpub. Ph.D. dissertation, George Peabody College for Teachers, 1943), p. 38.

[2]Lowell L. Hargens, "Patterns of Mobility of New Ph.D.'s Among American Academic Institutions," Sociology of Education, XLII (1969), p. 31.

Roberts' findings, but he grouped the colleges and universities into two categories, private and public. Roberts found 35.51 percent of all private and 32.04 percent of all public colleges and universities inbred.[3]

The percentage of inbred departments was different than the percentage of inbred faculty within inbred departments. As an example, 71 percent of the state supported doctoral departments were inbred, but only 17 percent of the faculty within the inbred departments were graduates of that department. While state supported doctoral departments ranked highest in the inbred listings, they were second only to the 14 percent inbred rate for geographers in private baccalaureate departments. Excluding the military academies, the church baccalaureate departments led with a 34 percent faculty inbred rate, followed by the municipal and state baccalaureate programs. This was generally due to a large number of baccalaureate departments that had a small staff in which one or two geographers were graduates from the same institution. The exception was the private baccalaureate schools. The state supported master's departments were second in inbred faculty percentages, followed by private doctoral programs. Therefore, an inverse trend seems to be in operation between the percentage of inbred departments and the percentage of inbred faculty within inbred departments. The highest degree programs have the highest percentage of departments inbred, but the lowest percentage for inbred faculty.

Publications were used as a measure of the faculty productivity. The quality of the publications were not considered. There was no

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[3]Roberts, ibid.

significant difference in the publication activities of inbred and noninbred geographers in the doctoral programs. Similar chi-square test results were found between the inbred and noninbred geographers in the master's and baccalaureate programs. A regional difference did become apparent in the state supported doctoral programs. The North Central Region was significantly more productive in publication activities when compared to other regions of the country.

The chi-square test was also used to test the difference between inbred and noninbred geographers and their acceptable percentage for inbreeding. In the baccalaureate and master's programs, the difference between the two populations were significant. The noninbred staff were less tolerant of inbreeding than the inbred geographers. In the doctoral departments, however, the noninbred and inbred geographers both agreed the inbred percentages should be low. Controlling agencies in their respective degree programs were also compared, where data were sufficient. The inbred and noninbred geographers were grouped together in each controlling agency. State and private baccalaureate staffs tended to select lower percentages in contrast to the church and federally controlled baccalaureate departments. Thus, four comparisons were significantly different in their acceptable percentages for inbred staffs at the baccalaureate level: state and church, state and federal, church and private, and private and federal.

The total baccalaureate faculty were grouped together to test the regional variations. Only the North Central Region was significantly different from the remainder of the United States. This was due to the high acceptable percentages in both state and church baccalaureate programs in the North Central Region of the country.

The inbred faculty in each baccalaureate group were compared with the other groups. In each test, there was no significant difference in the acceptable inbreeding percentage. Most inbred geographers employed on baccalaureate staffs selected a relatively high percentage; thus, the chi-square test was not significant and the null hypothesis could not be rejected.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Faculty inbreeding has been a segment within higher education in the United States almost from the time Harvard College was established. The researcher first noted inbreeding while studying faculty listings within college catalogues during the 1950's while attempting to determine where to attend college. The interest to study faculty inbreeding developed during the undergraduate and graduate years through general conversations with faculty and students and through observations. The study of inbreeding became more interesting later when the writer became a member of a university faculty. Previous publications on faculty inbreeding evaluated the total college or university population. This study did not follow the previous format, but attempted to study faculty inbreeding within a specific discipline, geography, and to use spatial analysis techniques to evaluate the areal distribution of faculty inbreeding.

This has been a descriptive study of inbreeding patterns and characteristics of geography departments in colleges and universities in the United States. The study period was for the 1976-1977 academic year. Attempts were made to evaluate inbreeding distribution, the productivity of inbred and noninbred geographers, and to ascertain what would be an acceptable percentage for inbred faculty by inbred and noninbred geographers. The above groupings were subdivided according to

the degree level of the department, the control status of the college or university, and the region in which the institution was located. The above will be discussed by topic with recommendations for additional research at the end of the chapter.

The highest percentage of inbreeding was found in departments that bestowed the doctoral degree for geographic study. Such departments exchanged graduates amongst each other, and most had one or more of their own graduates offering geographic instruction. Surprisingly, the state controlled universities had a higher percentage of inbred programs than the privately controlled departments. Most of the inbred doctoral programs were in the North Central Region of the country. State controlled doctoral departments in the Northeast were not inbred. Most departments kept the number of inbred faculty to a minimum. Less than one-fifth of the geographers employed by doctoral degree bestowing departments were classified as inbred. This suggests most departments hired qualified personnel from other institutions of higher education. However, there were several departments where a relatively large number of geographers were classified as inbred.

The master's degree granting departments were less inbred than those departments that bestowed the doctor's degree. All but one of the master's degree programs were state controlled. Less than half of the master's programs were inbred, and the largest concentration, both absolute and relative, was in the North Central Region of the country. The other three regions were about equal in the percentage of inbred programs.

More baccalaureate programs were classified as inbred because the baccalaureate colleges and universities represented the largest segment

of participating geography departments. The percentage, however, was lower than that of the master's and doctor's departments. Most of the geography departments employed but two or three geographers. Thus, the percentage was relatively high if the geographer was a graduate of the institution in which instruction was being offered. Federally controlled programs had the highest inbreeding percentage, followed by the municipal, church, state, and privately controlled departments. The percentage of inbred faculty was the lowest in state controlled departments, followed by those classified as private colleges. Most of the inbred baccalaureate departments were in the Northeast and North Central regions of the country. The South and West were least inbred.

The chi-square tests suggested there were no significant differences in the distribution between inbred and noninbred geographers amongst the four regions of the country. There were, however, significant differences of inbreeding between baccalaureate programs controlled by state, private, church, and federal agencies.

Another form of inbreeding, departmentally inbred departments, was evaluated in this study. There were 26 such departments, and 21 were baccalaureate institutions. Such departments did not consider themselves inbred even though 50 percent or more of the full time teaching staff were graduates of the same graduate program. Most of the departmentally inbred departments were dominated by a graduate university within the same state or region of the country.

The geographers employed in doctoral programs were more productive, as measured by publication activities, than geographers in the master's or baccalaureate programs. Similarly, noninbred geographers in the doctoral departments had more publications than inbred geographers, but

the differences were not significant. All geographers employed by doctoral programs in the North Central Region published significantly more than the geographers in the other regions of the country. Research by geographers in the doctoral departments represents a significant aspect of their employment. Thus, the lack of significant variations of publications between inbred and noninbred geographers in doctoral departments was not surprising.

Publication activities by geographers employed by master's degree programs were less, but the patterns were similar to the patterns for the doctoral programs. There were no significant differences between the publication activities of inbred and noninbred geographers, nor were there any regional variations.

As would be expected, geographers at the baccalaureate level did not publish as much as their counterparts in the master's and doctoral programs. There were no significant differences between the publication activities of inbred and noninbred geographers. When all the baccalaureate faculty were grouped together in their respective regions for comparison purposes, the geographers in the Northeast were significantly more productive than the other baccalaureate geographers in the country. The Northeast had the largest concentration of private and state controlled baccalaureate programs having geographers that published more than geographers in the other parts of the country. The scarcity of publications by geographers in baccalaureate programs was probably attributable to larger teaching loads and less money available for research.

A dean at the University of Minnesota suggested in the 1930's the maximum percentage for an inbred staff should be one-third. This

research generally suggests the acceptable percentage should be less than 20 percent. Only 13 percent of the more than 2,000 geographers that participated in this study were inbred. The percentage of inbred geographers was well below Dean Ford's one-third suggestion as well as the acceptable percentage findings in this research. Only within the doctoral departments did the inbred geographers agree with the noninbred staff that the acceptable percentage should be less than 20 percent. In the master's and baccalaureate programs, the inbred geographers had a higher acceptable percentage than the noninbred staff. The geographers in the baccalaureate departments controlled by church, municipal, and federal agencies were more lenient toward a higher acceptable percentage for an inbred staff.

Published studies of rank-order hierarchies of doctoral geography departments were compared. Additionally, a new system, the Doctoral Program Degree Points (DPDP) was devised in this study. Each graduate and ABD student of a doctoral department was assigned an arbitrary value according to the degree program in which the geographer was offering instruction. The DPDP rank-order system was generally comparable to the previously published hierarchical systems and presented a simplified quantitative method to rank doctoral programs.

An attempt was made to regionalize the doctoral bestowing departments for geographic study. The regions were delineated according to where graduates and ABD students of doctoral departments were employed during the 1976-1977 academic year. Two types of geography departments were revealed: regional and national. The latter had wider dispersal of their graduates and ABD students, whereas the former generally had 50 percent or more of their graduates and ABD students

employed in the same region as the bestowing institution, with some inroads into peripheral areas. The North Central Region, specifically the East-North Central Sub-Region, was the heart of geographic production of doctoral degree-holding geographers and ABD students. The same area was also the location for the greatest employment opportunities for geographers wanting to be employed in institutions of higher education bestowing the bachelor's, master's, or doctor's degree.

Summation

There were two types of doctoral programs, regional and national. These were delineated by the use of matrixes and by ascertaining what department and/or state had the largest number of doctoral graduates and ABD students employed in each state. There were 13 national universities and 16 regional universities. The Doctoral Program Degree Points hierarchical system was developed in this study and was generally comparable to the previously published rank-order systems.

Faculty inbreeding within geography departments was identified in all regions of the United States during the 1976-1977 academic year. While 30 percent of the participating departments were classified as inbred, less than 13 percent of the faculty were graduates of the school in which they were offering instruction. The majority of the geographers believed the inbred percentage should be less than 20 percent. Therefore, the overall inbred faculty percentage was already below the acceptable figure. There was basically no difference in the publication activities between inbred and noninbred staff members.

The assumption that inbred personnel are less productive than noninbred staff members generally was not supported by this study.

Inbreeding did not seem to be a problem in geography departments, and most geographers would prefer to keep inbreeding to a minimum. It is hoped college and university administrators would look carefully at any academic department where inbreeding escalates or goes beyond some predetermined upper level of acceptance.

Possible Additional Research on Inbreeding

It is hoped this thesis will lay the groundwork for further study on faculty and departmental inbreeding patterns and practices, by geographers as well as scholars of other disciplines. The scale of such studies can be quite variable. Several examples are (1) national studies of other disciplines to determine the degree of faculty and departmental inbreeding; (2) the study of inbreeding practices within specific regions of the country, such as the Northeast or the Southwest; (3) the study of faculty and departmental inbreeding practices within colleges and universities of a specific state, such as Oklahoma; or (4) the study of faculty and departmental inbreeding patterns within a specific institution of higher education. Other researchers may elect to analyze and to evaluate value judgements associated with having an inbred faculty and weighing the pros and cons of such practices. There may be a relationship between the degree of inbred faculty and a region of conservatism and/or liberalism. Historically, is the practice of inbreeding on the wane, as it has been in the military academies? And, finally, a possible follow-up study on inbreeding practices 10 years from now to compare inbreeding at that time within geography departments with the findings of this study.

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APPENDIXES

APPENDIX A

QUESTIONNAIRE

Name: _____ Date of Birth: _____
(last) (first) (M. In.)

Are you currently the chairperson of the Geography Department? ( ) Yes
( ) No

Name of the college or university in which you are currently employed as a full time geography faculty member: _____

Current academic rank: ( ) Instructor ( ) Associate Professor
( ) Assistant Professor ( ) Professor

What type of appointment do you have? ( ) Regular with tenure;
( ) Regular without tenure; ( ) Visiting lecturer or Professor

Please complete the following:

	Granting University or College	Year Awarded
Bachelor's Degree	_____	_____
Master's Degree	_____	_____
Doctor's Degree	_____	_____

If ABD status, work being completed at _____

Geographical specialties and/or areas of specialization. You may use the AAG numerical system if you wish.

How many articles, books, or monographs have you published or edited, alone or in collaboration? ( ) 1-5; ( ) 6-10; ( ) 11-15; ( ) 16-20; ( ) 21-25; ( ) 26 or more.

The standard definition for an inbred faculty member is one who has received one or more earned degrees from the institution in which he is giving instruction. What percentage would you consider to be the acceptable "upper limit" for "inbreeding" within a geography department? ( ) 10 % or less; ( ) 11-20 %; ( ) 21-30 %; ( ) 31-40 %; ( ) 41-50 %; ( ) greater than 50 %.

Would you like to receive a summary of the research findings on faculty inbreeding within geography departments? ( ) Yes ( ) No

APPENDIX B

LETTER TO THE GEOGRAPHER

October 1, 1976

Dear Colleague:

On the reverse side of this page is a very short questionnaire that I would appreciate you completing within the next couple of minutes. Where possible and with the aid of the Association of American Geographers Directory, 1974, I have filled in some of the information. Would you please check the completed portions for accuracy and fill in those blanks that are currently void of data? Please return the completed questionnaire to the department chairman who will place the questionnaire in a self addressed, stamped envelope to be mailed to the addressee.

I am doing research for my doctoral dissertation at Oklahoma State University. The dissertation will analyze inbreeding practices within geography departments of colleges and universities in the United States. Major emphases will be (1) to determine regionalization of such practices, (2) to determine if a hierarchy of inbreeding of full time faculty exists, and (3) to determine spheres of influence for the major advanced degree granting institutions. The data will be categorized into three divisions: (1) four year colleges and universities granting only the baccalaureate degree, (2) bachelor and master degree granting departments, and (3) doctoral degree granting departments.

The Association of American Geographers Directory, 1974, cannot be used because the directory (1) lists only the bachelor and the highest degree earned for each member, and (2) not all geographers teaching in higher education are members of the AAG.

All information contained within each completed questionnaire will be handled in the strictest of confidence. No information contained on the filled out questionnaire will be released to any person, department, or organization. The only use of the data will be for the proposed research by the investigator.

Thank you very much for your time and cooperation in this matter. A summary of the findings will be available to all participating departments, if requested, by checking the appropriate space found at the bottom of the questionnaire.

Respectfully,

APPENDIX C

LETTER TO DEPARTMENT CHAIRPERSON

October 1, 1976

Dear :

Enclosed are very short questionnaires that I would appreciate your distributing to your full time geography faculty for their completion. The back of each questionnaire has an introduction to the purpose of the study. It will take but two or three minutes for each staff member to complete the form. After completing the questionnaires, the faculty should return them to you or to your designated representative and be inserted in the enclosed, self-addressed, stamped envelope and mailed to the addressee.

Where possible, I have completed portions of the questionnaire from data within the 1976 Directory of College Geography of the United States, the 1974 Association of American Geographers Directory, and the Guide to Graduate Departments of Geography: 1975-1976. Should the named geographer no longer be on your staff, the former geographer's name should be crossed out and his replacement should complete the form. If additional geographers have been added to your staff, please have the new members answer the questions on a separate piece of paper and returned with the completed questionnaires.

The greater the number of returned, completed questionnaires, the greater the accuracy will be for the study of inbreeding patterns within geography departments across the United States. Your cooperation, therefore, is extremely important and pertinent. Again, I thank you for your time and cooperation in helping me with this study.

Respectfully,

Alfred C. Robertson
Earth Science Department
Southeast Missouri State University
Cape Girardeau, Missouri 63701

Phone: Area Code 314 334-8211
Ext. 272

APPENDIX D

TABLE LXXII

TABULATION OF QUESTIONNAIRES SENT AND RECEIVED

State	Number		Per-	State	Number		Per-
	Sent	Returned	cent		Sent	Returned	cent
Alabama	37	25	67.6	Montana	13	11	84.6
Alaska	3	3	100.0	Nebraska	37	28	75.7
Arizona	34	31	91.2	Nevada	6	1	16.7
Arkansas	26	25	96.2	New Hampshire	25	19	76.0
California	278	139	50.0	New Jersey	64	45	70.3
Colorado	68	59	86.8	New Mexico	16	11	68.8
Connecticut	25	15	60.0	New York	209	145	69.4
Delaware	10	9	90.0	North Carolina	91	75	82.4
District of Columbia	28	6	21.4	North Dakota	12	9	75.0
Florida	57	30	52.6	Ohio	148	115	77.7
Georgia	51	39	76.5	Oklahoma	47	36	76.6
Hawaii	23	2	8.7	Oregon	52	33	63.5
Idaho	10	1	10.0	Pennsylvania	181	116	64.1
Illinois	180	139	77.2	Rhode Island	12	8	66.7
Indiana	87	63	72.4	South Carolina	26	19	73.1
Iowa	41	33	80.5	South Dakota	15	15	100.0
Kansas	37	28	75.7	Tennessee	54	31	57.4
Kentucky	58	28	48.3	Texas	77	66	85.7
Louisiana	63	50	79.4	Utah	29	27	93.1
Maine	10	1	10.0	Vermont	16	12	75.0
Maryland	63	33	52.4	Virginia	57	44	77.2
Massachusetts	90	69	76.7	Washington	46	32	69.6
Michigan	116	80	69.0	West Virginia	27	20	74.1
Minnesota	80	53	66.3	Wisconsin	149	98	65.8
Mississippi	19	15	78.9	Wyoming	6	5	83.3
Missouri	58	40	69.0	TOTALS:	2,967	2,037	68.6

VITA 2

Alfred Charles Robertson

Candidate for the Degree of

Doctor of Education

Thesis: INBREEDING PATTERNS IN GEOGRAPHY DEPARTMENTS AND THE REGIONALIZATION OF DOCTORAL GEOGRAPHY DEPARTMENTS: 1976-1977

Major Field: Higher Education Minor: Geography

Biographical:

Personal Data: Born in Los Angeles, California, June 11, 1935, the son of Mr. and Mrs. Alfred S. Robertson. Married, wife Mary Ann, daughters Alana and Beth.

Education: Graduated from Nordhoff Union High School, Ojai, California, in June, 1953; enrolled in Ventura Junior College, California, in September, 1953; enrolled in Bakersfield College, California, in February, 1958; enrolled in Belleville Junior College, Illinois, in September, 1958; received the Bachelor of Science in Education degree from Illinois State University in June, 1961; received the Master of Science degree from Illinois State University in August, 1962; enrolled in the doctoral program at the University of Nebraska in June, 1963; enrolled in the doctoral program at the University of Kansas in September, 1965; completed the requirements for the Doctor of Education degree at Oklahoma State University in July, 1978.

Professional Experience: Graduate teaching assistant, Department of Geography and Geology, Illinois State University, 1961-62; Instructor of Earth Science, Earth Science Department, Southeast Missouri State University, 1962-1965; graduate teaching assistant, Department of Geography and Meteorology, University of Kansas, 1965-66; Instructor of Earth Science, Earth Science Department, Southeast Missouri State University, 1966-67; Assistant Professor of Geography, Earth Science Department, Southeast Missouri State University, 1967-75; graduate teaching assistant, Department of Geography, Oklahoma State University, 1975-76; Assistant Professor of Geography, Earth Science Department, Southeast Missouri State University, 1976-.

Professional Organization: Association of American Geographers.